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A DEMOGRAPHIC PROFILE OF RURAL ALASKA: 1980

A

THESIS

Presented to the Faculty of the University of Alaska

in Partial Fulfillment of the Requirements

for the Degree of

MASTER OF ARTS

By

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Fairbanks, Alaska

May 1982

A DEMOGRAPHIC PROFILE OF RURAL ALASKA: 1980

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April 22, 1982
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ABSTRACT

Data from the 1980 Alaska census were analyzed to provide a broad perspective on Alaskan demographic characteristics. Crude and standardized fertility and mortality rates were computed for different census areas. The lowest fertility and mortality rates were found among non-native urban dwellers, while the highest regional fertility and mortality rates were found in predominantly native rural census areas. The number of native residents in Alaska's major cities increased over the past decade, but the percentage of natives living in villages is very similar to that of a decade ago. A statistical relationship was found between sex ratios in small communities and rate of population growth in the past decade. Correlations were also found between housing characteristics, ethnic composition and mortality rates in census areas. Intra- and inter-state migration have continued to be important in determining Alaskan population structure.

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ACKNOWLEDGMENTS

This study would have been impossible without the help and advice of a number of people. John Kruse at the Institute of Social and Economic Research was especially helpful in facilitating access to the census tapes. Patricia Book of Northern Alaska Health Resources Association, Inc. and Frederick Milan of the University of Alaska, Fairbanks provided additional references and helpful advice. The Office of Information Services at the Alaska State Department of Health and Social Services were also helpful in providing 1980 fertility and mortality data.

The graduate committee that oversaw this thesis, consisting of G. Richard Scott (Chairman), Anne Shinkwin, and Joseph Gross, provided very valuable assistance and advice in both choice of topic and the final form of this study. Their critical comments and tolerance of different perspectives were very helpful in refining the viewpoints expressed here.

I

INTRODUCTION

Demography is the study of populations and the necessary biological events that relate to the growth and structure of human populations. The major biological events studied by demographers include birth, death, and migration. The demographic or biological structure of populations can change through only these three mechanisms. This study examines these three demographic characteristics in contemporary Alaska. Population structure and migration are examined first, then regional and ethnic differences in mortality and fertility are analyzed. The approach used is synchronic, and the majority of data used relate only to the census year, 1980.

A number of disciplines regularly use demographic methods and data in researching social trends and problems. In Alaska, demographic data have been used for evaluating patterns of perceived social and psychological problems (Hippler, 1976; Hippler and Wood, 1977; Krause and Buffler, 1979; McNabb, 1980). Research on Alaskan labor markets and economic models have incorporated both demographic methods and data (Bland, 1976, 1978; Goldsmith, 1979; Seiver, 1975). Demographic techniques have been used in documenting Alaskan native health conditions (Blackwood, 1979a,b, 1980a,b,c). Some anthropological research in demography has been conducted with more general theoretical goals (Binford and Chasko, 1976; Milan, 1970, 1978; Milan and Pawson, 1975). Anthropological and other problem-oriented approaches often focus on a narrow segment of the Alaskan population. Instead of dealing with

the Alaskan population as a whole, a particular age group, ethnic group or community has been selected. These studies are very valuable in providing detailed views of certain subsets of the Alaskan population, but an overall perspective seems to be lacking.

This study provides a preliminary analysis of Alaskan demographic patterns in 1980. It is addressed primarily to anthropological interests, especially the effects of rapid social and cultural change upon population structure in rural Alaska. This study provides basic data useful for future research in anthropological demography, medical anthropology, and social/cultural anthropology. In addition, preliminary hypotheses are presented that relate to associations in the data analyzed and may warrant consideration in future research design.

The intent here is to produce a broad picture of demographic trends in the recent Alaskan past. All demographic research is in one sense historical, since all demographic data consist of events that have already occurred. This study is designed to present information on demographic trends in a timely fashion to the Alaskan research community. Demographic trends can change very rapidly. For example, Krause and Buffler (1979) studied native suicide deaths in the early 1970's. They provided well-documented data on an increase in native suicide deaths. By the second half of the decade, however, native suicides, both absolutely and relatively, had decreased substantially in the years 1975 to 1979 (Department of Health and Social Services, 1976, 1977, 1978, 1980, 1981). By the time their study was published the trend they were documenting had reversed. This is not intended to denigrate a careful and well done quantitative study, but to emphasize

the need for timely analysis. Demographic trends in Alaska can be very volatile in times of rapid social and economic change. If demographic data are presented as rapidly as possible to planners and researchers, then ongoing research and policy planning can be formulated more in accord with demographic realities rather than estimates.

This study covers demographic aspects of the entire state at least to some extent. All areas of the state are reviewed superficially, and certain communities are highlighted to give a more detailed perspective. Most of the emphasis here is on differences in age, sex, and ethnic composition of different areas of the state. This kind of information is useful in determining what kinds of individuals and families are moving to different areas of the state. Demographic data and analysis are often difficult to translate into a human perspective, or even a community perspective (Oberg, 1977). For this reason, demographic terminology is kept to a minimum.

MATERIALS

A number of different data sources were used in the preparation of figures and tables for this paper. The 1980 population counts came from the STF1A census computer tape produced by the U.S. Bureau of the Census. The fertility and mortality information came directly from the Alaska Department of Health and Social Services (DHSS) for the year 1980. Data for previous years were obtained from DHSS publications (DHSS, 1976, 1977, 1978, 1980, 1981). Where more detailed information is used (Table 10), it was obtained from National Center for Health Statistics (NCHS) Publications (NCHS, 1980). Census information for

1970 was obtained from publications by the Institute of Social, Economic, and Government Research (ISEGR) of the University of Alaska (ISEGR, 1972, 1973). All data on total U.S. populations and foreign national populations are from Keyfitz and Flieger (1971).

The limitation to any demographic research is the amount of data available, and this study is no exception. Demographic data tend to be processed slowly because of the sheer magnitude of work involved. Although this is being written two years after the census date, April 1, 1980, only a limited amount of census data has been processed, and some very useful breakdowns and tabulations are not yet available. In addition, only limited fertility and mortality data are available from DHSS since the data processing is still in progress. This study could be much more complete if executed several years in the future. The problem is that by 1985, when much more information is available, the actual population structure will be very different than it was in 1980. It is thought that more timely presentation of demographic information, although not as definitive as later studies, may indicate profitable avenues for later research to follow.

A number of communities in Alaska have complained about the quality of local preliminary census counts. Kruse and Travis (1981) did an evaluation of the effectiveness of the 1980 census by interviewing census employees about their procedures and problems. Certain areas were indicated where census data may be in significant error, relating primarily to information on income, fertility, and marriage. Kruse and Travis also noted that census counts for labor and lumber camps might be seriously in error, and canneries might be undercounted. In

general, however, they felt the population and housing counts were accurate within two percent.

For census purposes the state was divided into 23 census areas. The boundaries of these areas were decided by discussions between the State of Alaska and the U.S. Bureau of the Census. They are presented in Figure 1. Unfortunately, almost all of them are different from the census divisions used in the 1970 census, making direct comparison difficult. The census areas are used as analytical units in this study because they are large, convenient units that provide distinctive demographic characteristics for analysis, but small enough in number to include the entire state in this analysis.

A number of other demographic studies in Alaska have used aggregated fertility and mortality figures for several different years in an attempt to obtain a representative view of factors affecting fertility and mortality in Alaska. Most of the vital events analyzed in the later sections of this study utilize only data from the year 1980. This synchronic approach was the outgrowth of the availability of good population figures from the 1980 census. These relatively good population figures are preferable to population estimates for standardization calculations.

To determine whether 1980 was a typical year or not, average birth and death rates for the period 1975 to 1979 were compared to those for 1980. As Table 1 indicates, 1980 was not an unusual year. Some areas had higher or lower rates than the preceding five years, but in general the rates are of the same magnitude. Table 2 indicates there are some secular trends in Alaskan fertility and mortality that

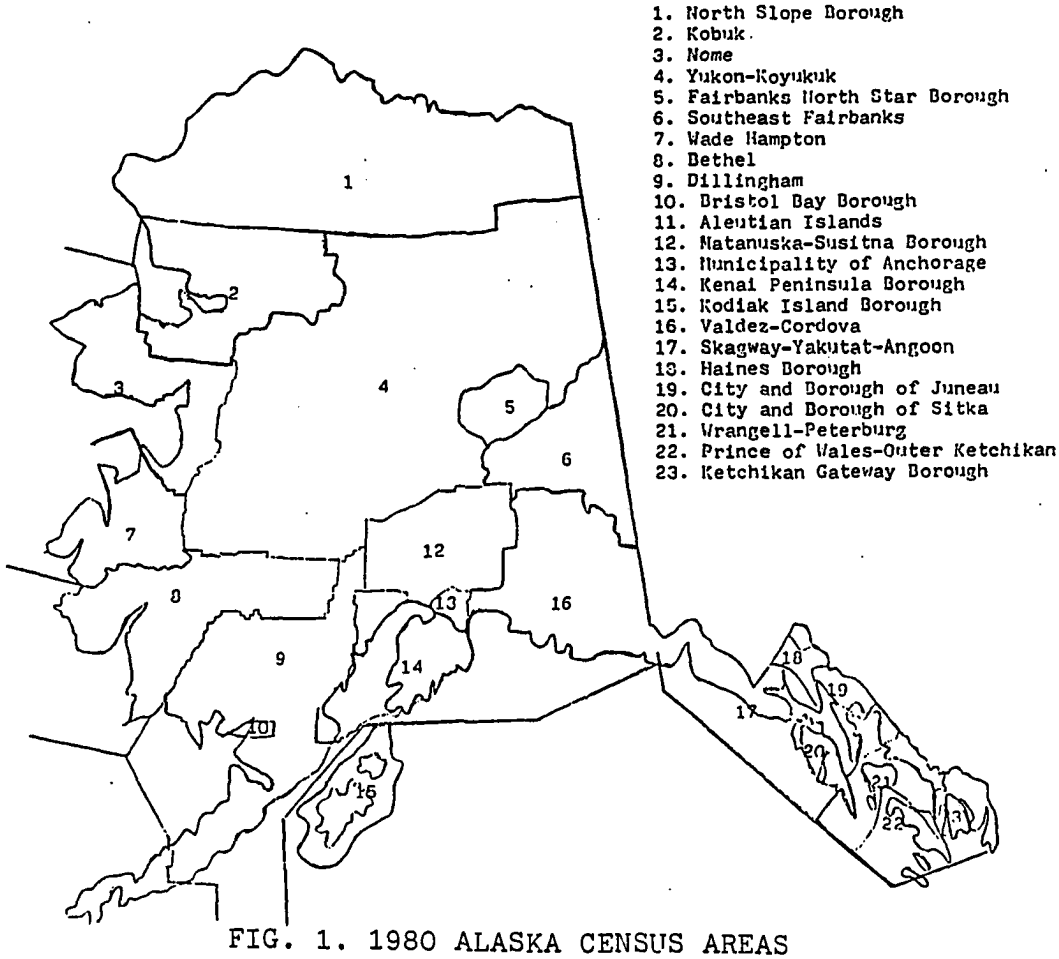


FIG. 1. 1980 ALASKA CENSUS AREAS

TABLE 1. AVERAGE BIRTHS AND DEATHS 1975-79 AND 1980

CENSUS AREA	TOTAL DEATHS 1980	MEAN DEATHS 1975-79	TOTAL BIRTHS 1980	MEAN BIRTHS 1975-79
Alaska Total	1688	1609	9490	8348
1. North Slope Borough	28	20	102	74
2. Kobuk	39	34	146	143
3. Nome	53	55	199	162
4. Yukon-Koyukuk*	55	51	187	155
5. Fairbanks North Star Borough	188	190	1410	1288
6. Southeast Fairbanks*	15	23	143	138
7. Wade Hampton	24	24	130	123
8. Bethel*	64	56	287	247
9. Dillingham	22	25	121	83
10. Bristol Bay Borough	3	4	10	15
11. Aleutian Islands	30	21	165	132
12. Matanuska-Susitna Borough	77	77	382	292
13. Municipality of Anchorage	593	552	3936	3619
14. Kenai Peninsula Borough	105	106	588	501
15. Kodiak Island Borough	50	46	275	240
16. Valdez-Cordova	45	43	179	163
17. Skagway-Yakutat-Angoon	38	25	84	70
18. Haines Borough	12	8	37	30
19. Juneau Borough	78	79	426	317
20. Sitka Borough	42	41	219	157
21. Wrangell-Petersburg	38	36	120	114
22. Prince of Wales-Outer Ketchikan	17	22	81	70
23. Ketchikan Gateway Borough	68	73	248	217

*These census areas had major changes in boundaries between 1975 and 1980 so estimates were used in calculating averages

TABLE 2. TOTAL ALASKAN BIRTHS AND DEATHS 1975-1980

YEAR	TOTAL ALASKAN BIRTHS	TOTAL ALASKAN DEATHS
1975	7,470	1,522
1976	7,912	1,617
1977	8,378	1,606
1978	8,849	1,698
1979	9,129	1,604
1980	9,490	1,688

might make aggregated figures less accurate. The number of births in the state has been steadily increasing for the past six years, and there is a slight increase in total mortality over this six year period. The average number of deaths in the state in the past three years is about 5% higher than the preceding three years.

In addition to changes in age structure that cannot be documented accurately using aggregated figures, the economic and social conditions in the state have changed greatly from the mid-1970's with the construction of the oil pipeline.

METHODS

Tragic and joyous events like death and birth are infrequent for an individual, yet since the 17th century (Graunt, 1975) it has been realized that random and traumatic life events tend to occur with statistical regularity and with different patterns in different populations. These patterns change with time, populations grow and shrink, the proportion of young to old may change (age structure), and environmental, cultural, social, and economic factors may cause changes in birth and death rates.

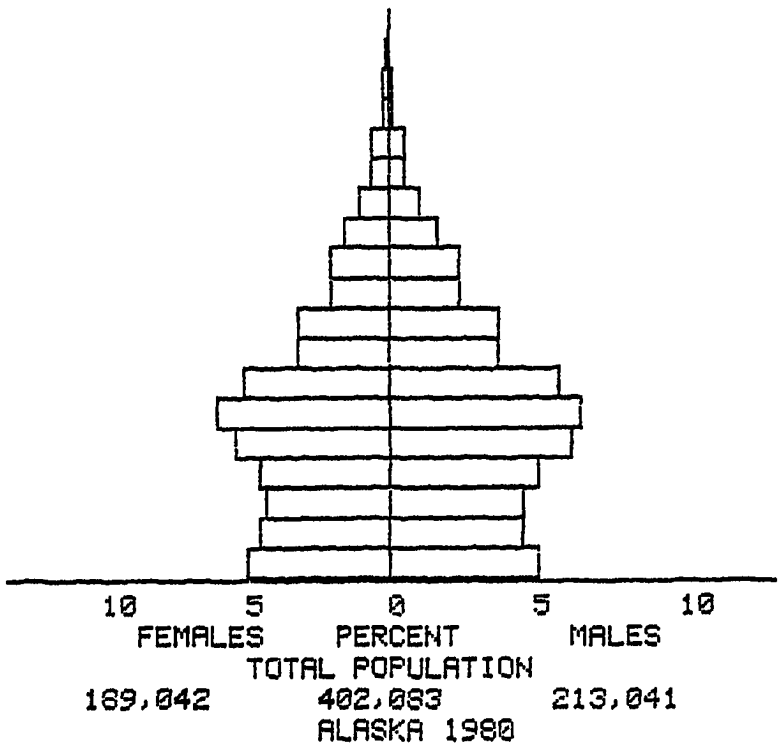
A number of different techniques are used to illustrate the demographic characteristics of Alaska in 1980. Population pyramids are the simplest heuristic device (Fig. 2). This is a profile which shows the proportion of the population of each sex of a certain cohort (age group). All population pyramids in this paper were constructed by an identical procedure. Each horizontal block represents a five year age cohort of the population. The relative size of each block on both

sides of the centerline is a measure of proportions of the different sexes in that cohort. The bottom block which represents all individuals less than five years old comprise approximately 10% of the total Alaskan population in the 1980 census. The cohorts get older as they continue up the pyramid, culminating in the eighteenth cohort for individuals over 85 years old.

Population pyramids are a widely used analytical tool in demographic research. Detailed demographic analyses always include them (Howell, 1980:Fig. 2.6; Fix, 1977:Fig. 4.3) to provide an overall perspective on age and sex composition. They are often used as a preliminary to more sophisticated demographic techniques. Unfortunately, the kind of data necessary for detailed analysis and the construction of life tables for 1980 will not be available for several years. Keyfitz and Flieger (1971) present detailed techniques for use with standard data sets on population, fertility, and mortality. Since the early census tape data are not broken down in the correct ethnic age and sex distributions, it is impossible to use these techniques. In addition, the State of Alaska has never tabulated mortality data in five-year cohorts, the necessary increment for constructing standard abridged life tables (Department of Health and Social Services, 1976, 1977, 1978, 1980, 1981). For this reason, population pyramids represent the basic data available, and they are presented for a number of different regions and communities. They can display a wealth of information on age and sex distribution that cannot be conveyed efficiently in any other way.

Population pyramids provide an impressionistic form of demographic information. Figures 2 and 3 show some comparative extremes. The top pyramid in Figure 2 is the Alaskan population in 1980. The large symmetrical bulges in the center of the pyramid are evidence of extensive non-native migration into Alaska. These migrants are often individuals in their twenties and thirties, which is reflected by the vertical position of these bulges. The bottom half of Figure 2 is the population pyramid of the United States for the year 1967. The year 1967 was chosen because a wide range of information was readily available for that year. Moreover, in 1967 the United States was past the "baby boom" increase in the birth rate after the Second World War. Many of the babies born at that time were no longer in the youngest age cohorts, providing some slight similarity to the 1980 Alaskan population. While this pyramid is obviously not the same as the Alaska pyramid, it is closer to it than later U.S. populations. This is important in choosing a population for standardizing birth and death rates, since standardization techniques produce more accurate results if the population used for standardization is as close as possible to the population analyzed (Shryock et al., 1976).

The population pyramids for Alaska in 1980 are not exact. The census tape information used to create them only provides population information in ten-year cohorts for the age categories 35-44, 45-54, 65-74, and 75-84. These figures have been interpolated by dividing in half. This is a much simpler interpolation procedure than many mentioned by Keyfitz and Flieger (1971) and Shryock et al. (1976). The reason for using this method of interpolation is that the Alaskan



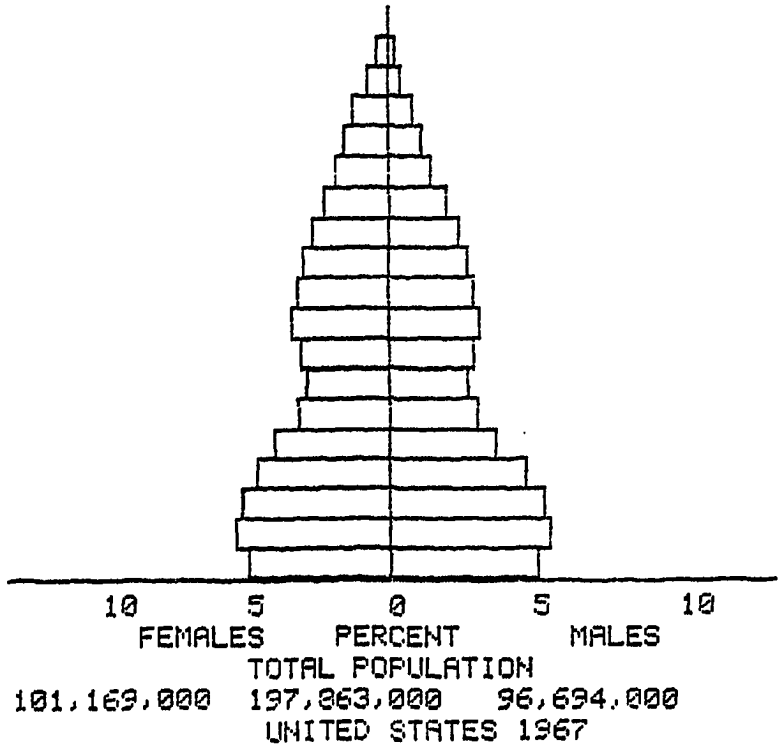
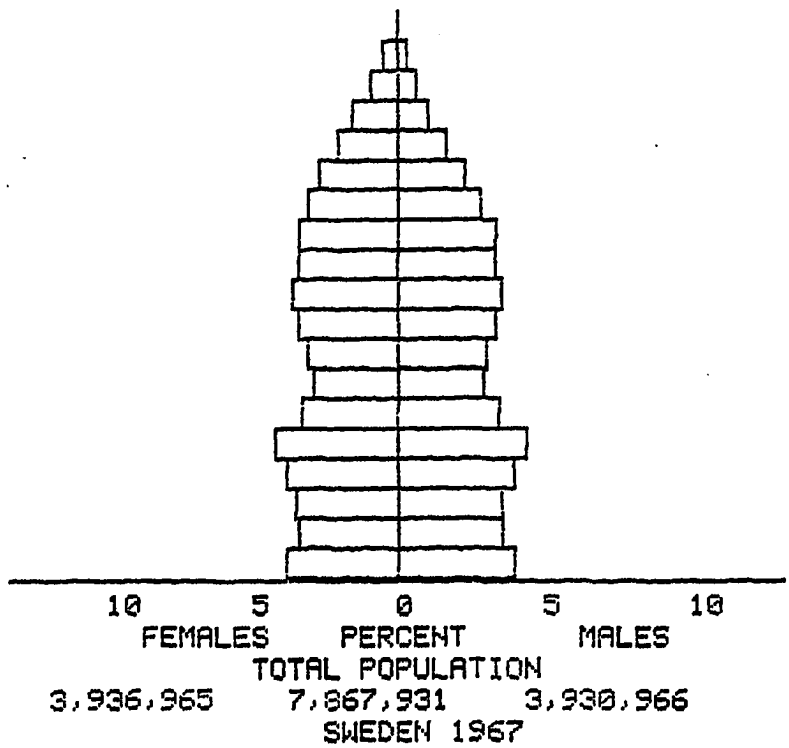


FIG. 2. POPULATION PYRAMIDS FOR ALASKA 1980 AND UNITED STATES 1967



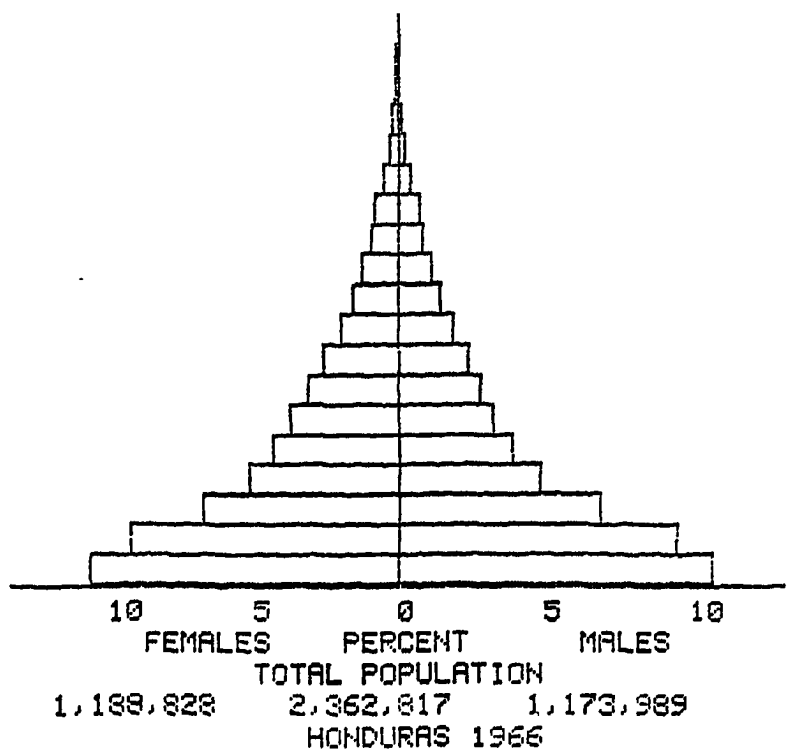


FIG. 3. POPULATION PYRAMIDS FOR SWEDEN 1967 AND HONDURAS 1966

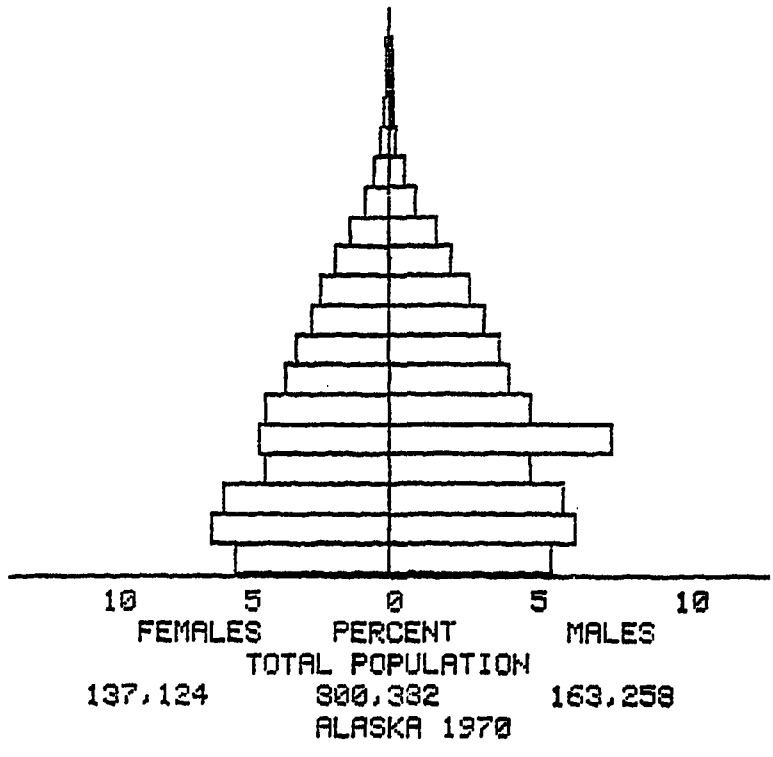
population is strongly influenced by in and out migration of different age groups, and many interpolation methods are based on the implicit assumption that migration is low or irrelevant, and changes in one cohort are related to those cohorts adjacent to it. All interpolated data for the population pyramids were rounded up for the younger cohorts and down for the older one.

Figure 3 shows two classic populations at different ends of the growth scale. Sweden is almost a stable population with a very low growth rate. This can be seen by comparing the size of the youngest and oldest cohorts which do not differ greatly in size. Honduras, on the other hand, is a rapidly growing population. This is obvious from the relative size of the youngest and oldest cohorts. This difference in age structure can also be expressed numerically by the percentage of population under 15 years of age. Honduras in 1966 had 51.5% of its population under 15 years of age, while Sweden had only 21% of its population in that age group (Keyfitz and Flieger, 1971). As can be seen, the Alaskan population falls between these two extremes, with a rapidly growing population (large cohorts at the bottom of the pyramid), but not growing as fast as developing countries like Honduras.

Some fertility and mortality rates are also presented to allow comparison of vital rates between different populations. Crude rates are calculated as follows: Crude Mortality Rate = (Total Deaths/Population) X 1000. The difficulty with comparing the crude rates of different populations is that populations with different sex ratios or age distributions can have very different crude birth and death rates under identical social and environmental conditions. A popula-

tion with a higher proportion of older members would tend to have a higher crude death rate (CDR) than a younger population. In American populations females have greater longevity than males, so populations with a higher proportion of females would also tend to have a lower crude death rate. The demographic technique used to compare population vital rates is called standardization. The method used in this paper is a computer program (modified to run in BASIC on a TRS-80 microcomputer) for Indirect Standardization provided by Keyfitz and Flieger (1971). Indirect rather than direct standardization was used because the mortality data provided by the State of Alaska were aggregated in 10 year cohorts, while the population data permitted comparison in 5 year cohorts. Indirect standardization allowed the use of 5 year cohorts and vital event totals.

Age structure can change rapidly through time. Figure 4 shows the Alaskan population in 1970 and 1980. The effects of the oil pipeline and associated economic development can be observed from the great increase in the proportion of the population in their twenties and early thirties. In 1970 there were proportionally more children, and the sex ratio for young adults was more distorted. Migration in the past decade has been more evenly divided between the sexes, and has consisted mainly of young adults.



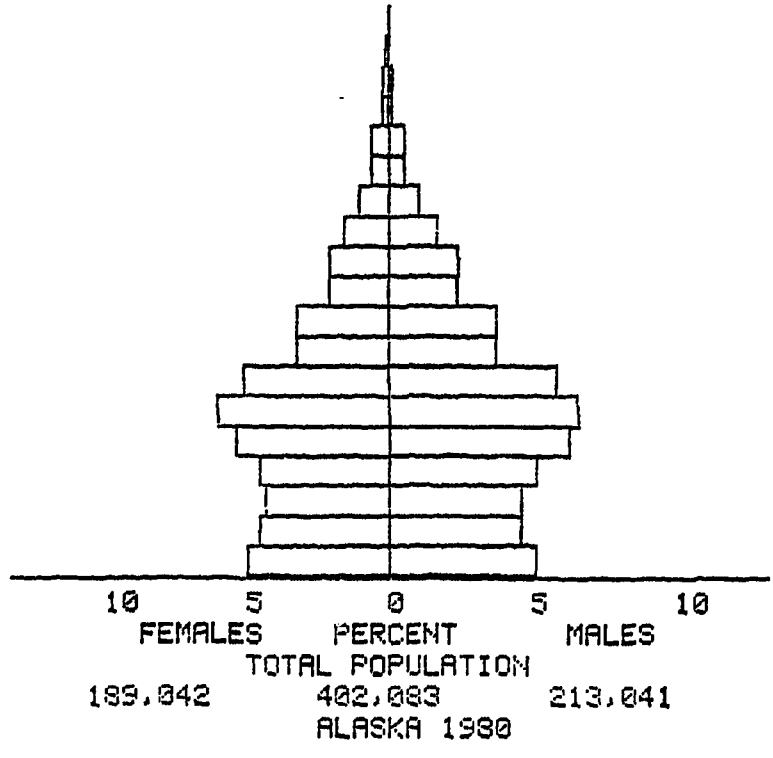


FIG. 4. POPULATION PYRAMIDS FOR ALASKA 1970 AND ALASKA 1980

II

POPULATION STRUCTURE

In 1980 the U.S. census (according to census tape STF1A) counted 401,851 people living in Alaska. This is an increase of almost 33% over the 302,647 counted in the 1970 census. The native population (including non-Alaskan American natives) was approximately 64,103, an increase of almost 27% over the 1970 population count of 50,654. A figure of 54,700 natives is occasionally seen in the literature for the 1970 census, but this represents the total in the "other" category, the total population left after blacks and whites were tabulated. The "other" category also included some 4,000 Chinese, Japanese, and Filipinos (ISEGR, 1972). As Milan and Pawson (1975) point out, these figures may well be underestimates, since they are well below figures used by the Bureau of Indian Affairs and the Alaska Native Claims Settlement Act. Blackwood (1980c) estimates the clientele of Alaskan Native Health Services number about 75,600 in 1980. Binford and Chasko (1976) list a population of 134 in Anaktuvuk Pass in 1968, while the 1970 census counted only 99 residents in that village. This may indicate some villages were substantially underenumerated in 1970. Krause and Buffler (1979), however, in an independent population assessment, estimate the 1974 native population at about 56,400, which is much more compatible with both the 1970 and 1980 censuses. The census figures are used in this study, since there is the possibility that some clients of BIA and ANHS might be eligible for agency services under law, but not be classified native for any other purposes. For

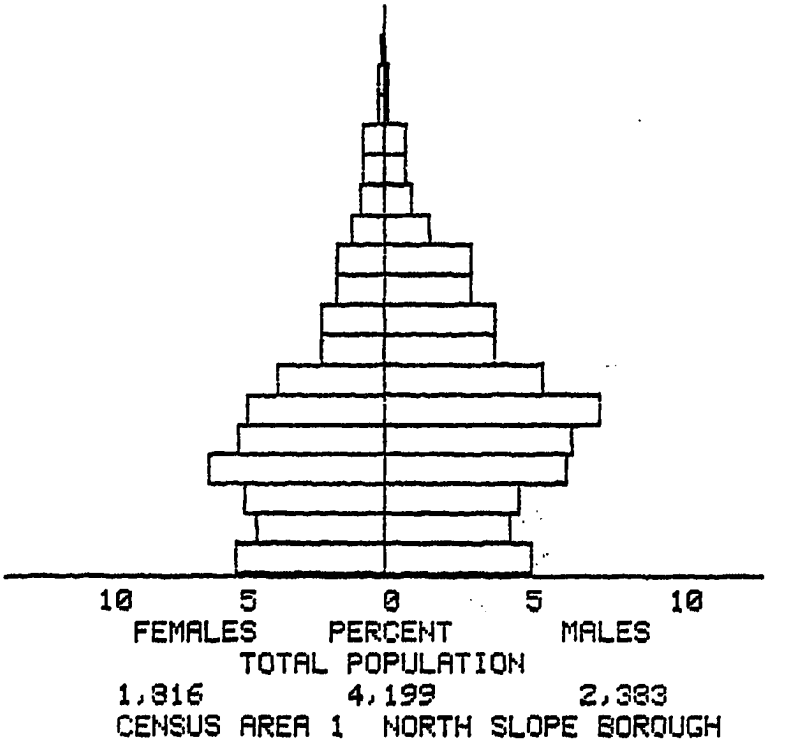
example, a non-native woman giving birth to a part-native child might be an eligible client for ANHS even though for census purposes she would not be counted as a native.

CENSUS AREAS

Figures 5 through 16 show the population pyramids for each of the 23 census areas. Table 3 shows the population figures for 1980 and 1970, and the percentage of increase in each. The largest population increase in the 1970's was in the Matanuska-Susitna Borough which had 2.7 times as many inhabitants in 1980 as in 1970. Other areas immediately surrounding Anchorage, including the Kenai Peninsula Borough and the Valdez-Cordova census area also show very large population increases. From the population pyramids for these regions (Fig. 10-12) it appears that this growth is largely due to migration, with the large bulges associated with migrancy appearing in the 20-35 age categories. This is in contrast to the predominantly native census areas (Table 4) that have more regular age distributions.

The greatest growth in rural population seems due to non-native migration to rural areas relatively near the major cities. Southeast Fairbanks Census Area on the Alaska Highway near Fairbanks shows a very sizeable increase, although not as great as census areas near Anchorage.

There are a number of military personnel stationed in Alaska. In some of the smaller census areas, like the Bristol Bay Borough, the large number of military personnel will produce somewhat skewed age and sex distributions. In the larger census areas, like the Muni-



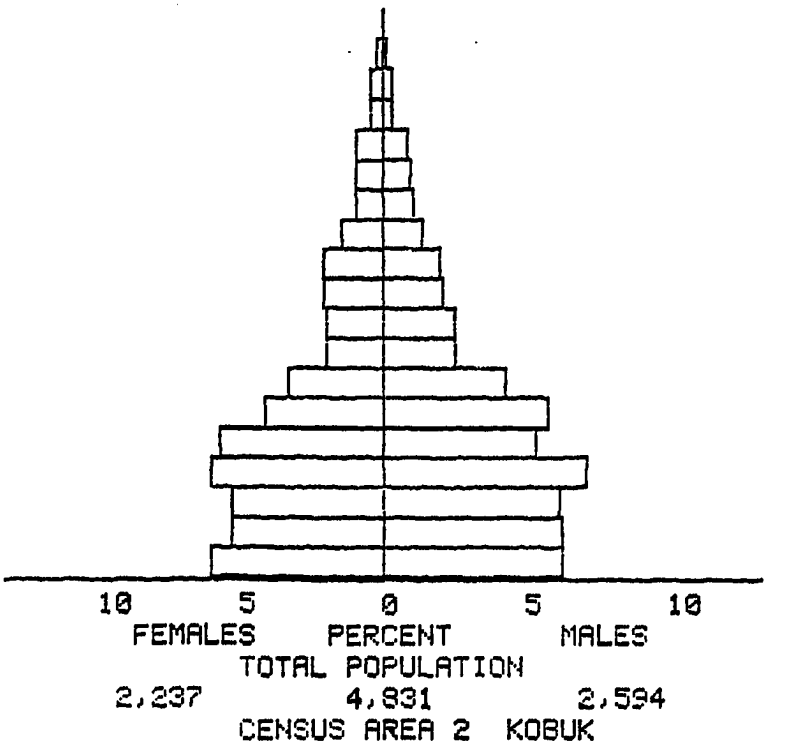
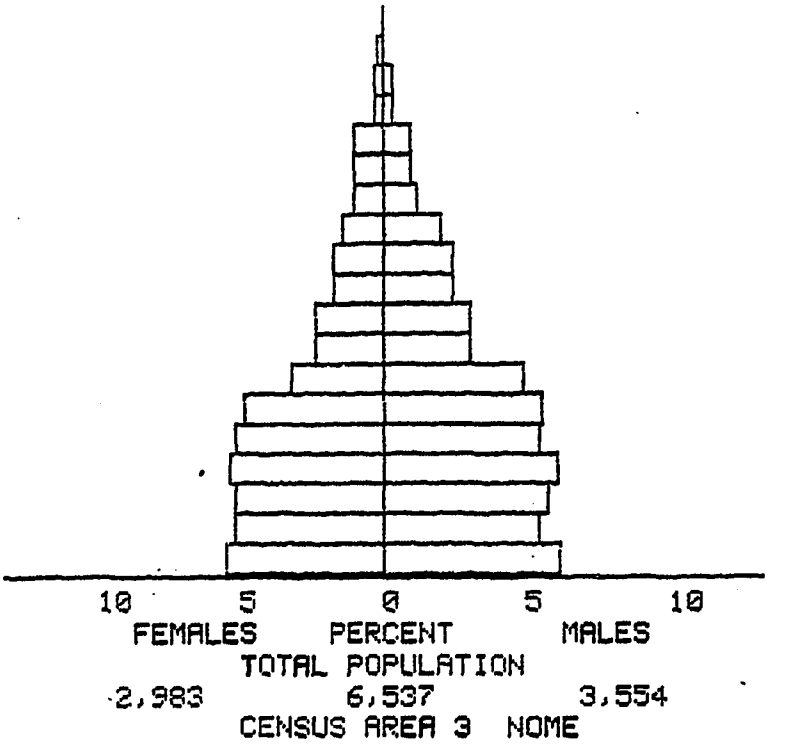


FIG. 5. POPULATION PYRAMIDS FOR CENSUS AREAS 1 AND 2



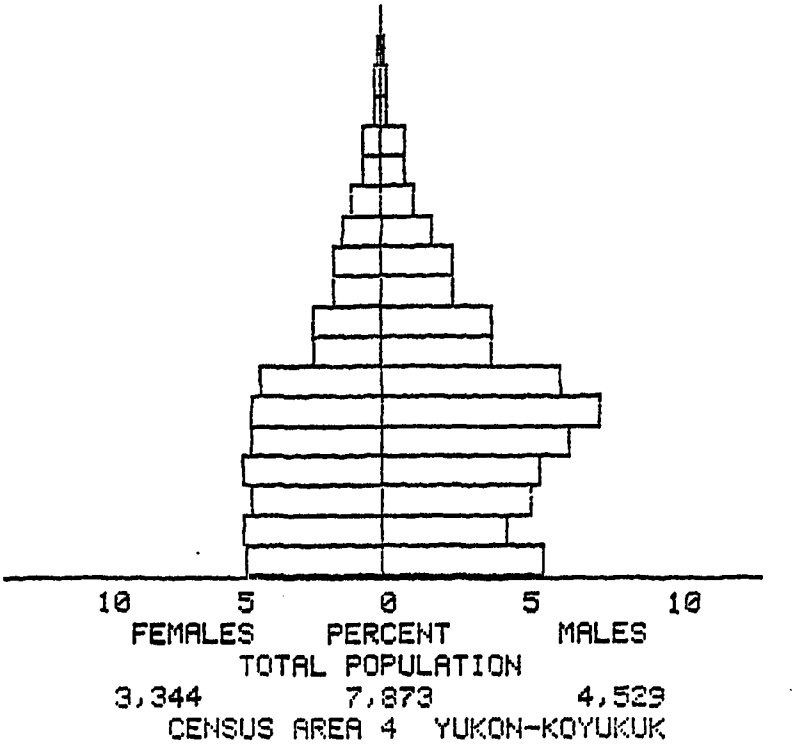
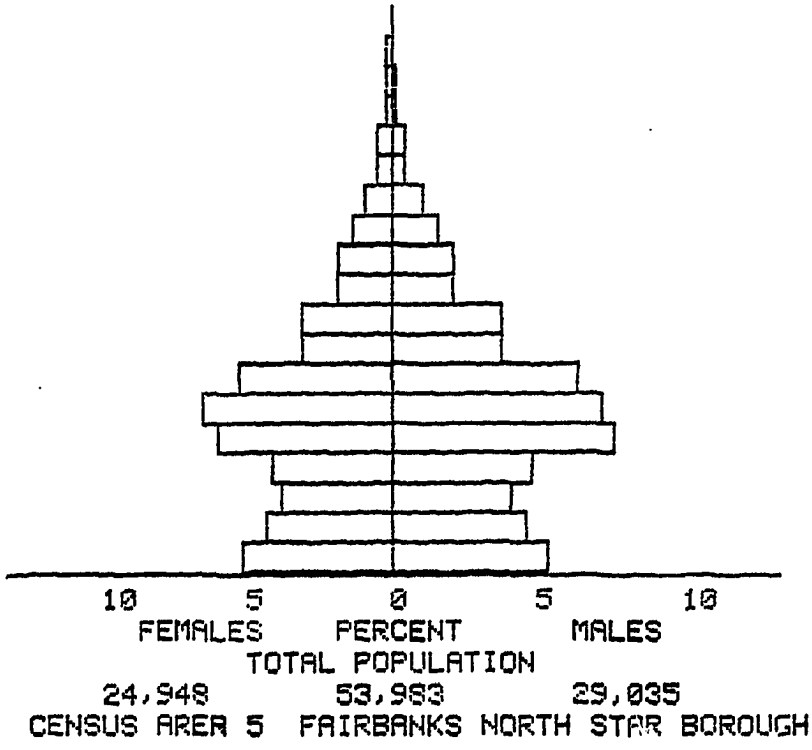


FIG. 6. POPULATION PYRAMIDS FOR CENSUS AREAS 3 AND 4



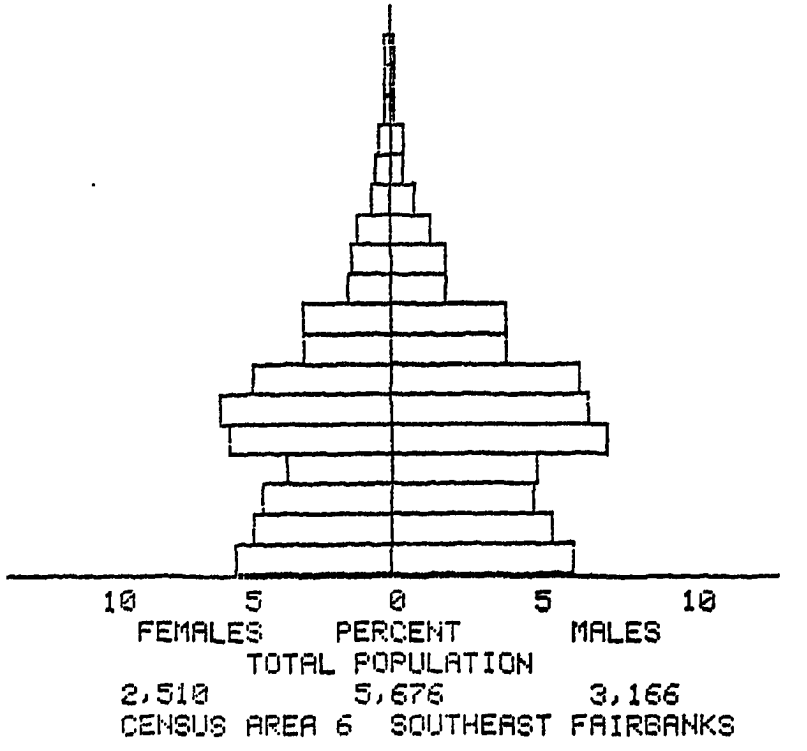
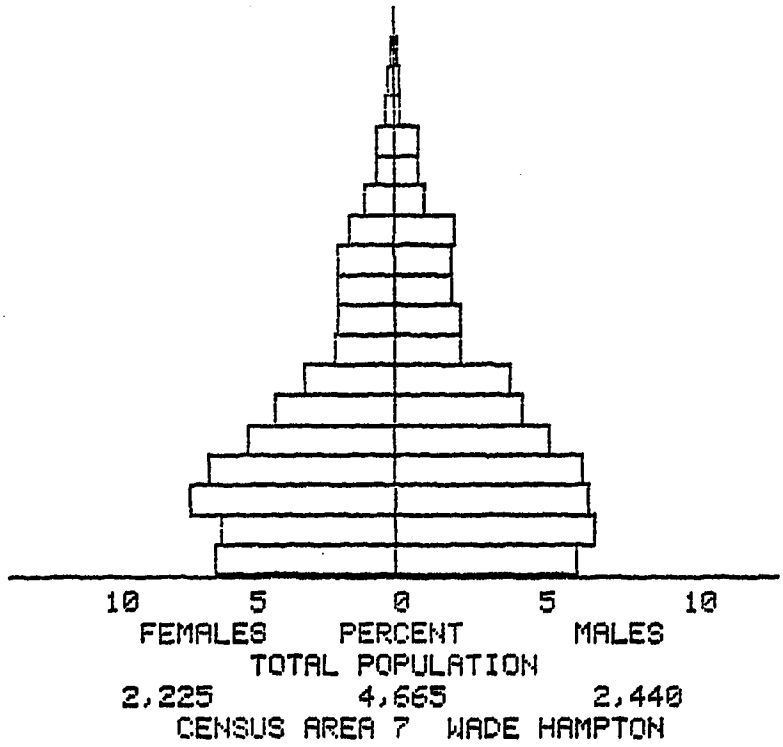


FIG. 7. POPULATION PYRAMIDS FOR CENSUS AREAS 5 AND 6



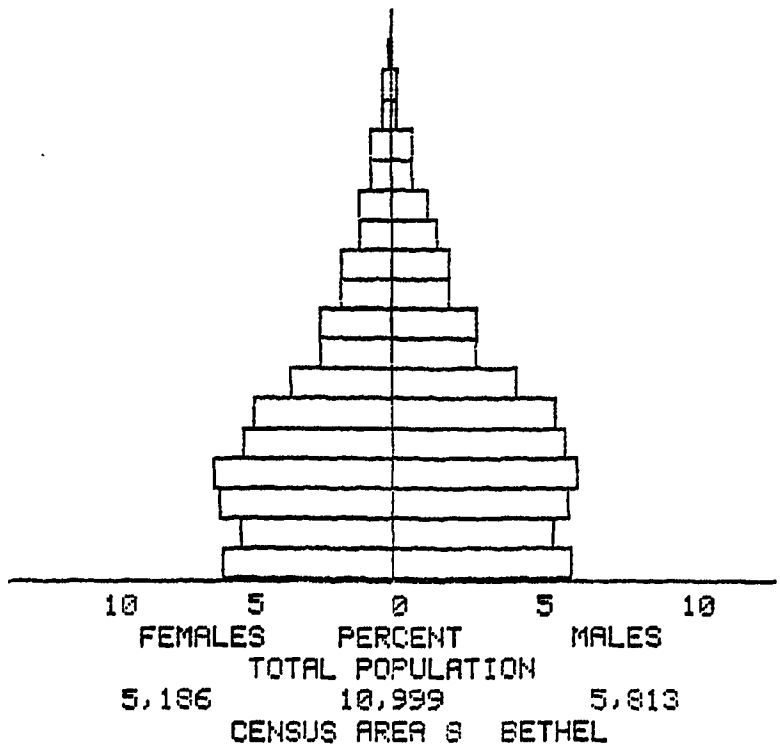
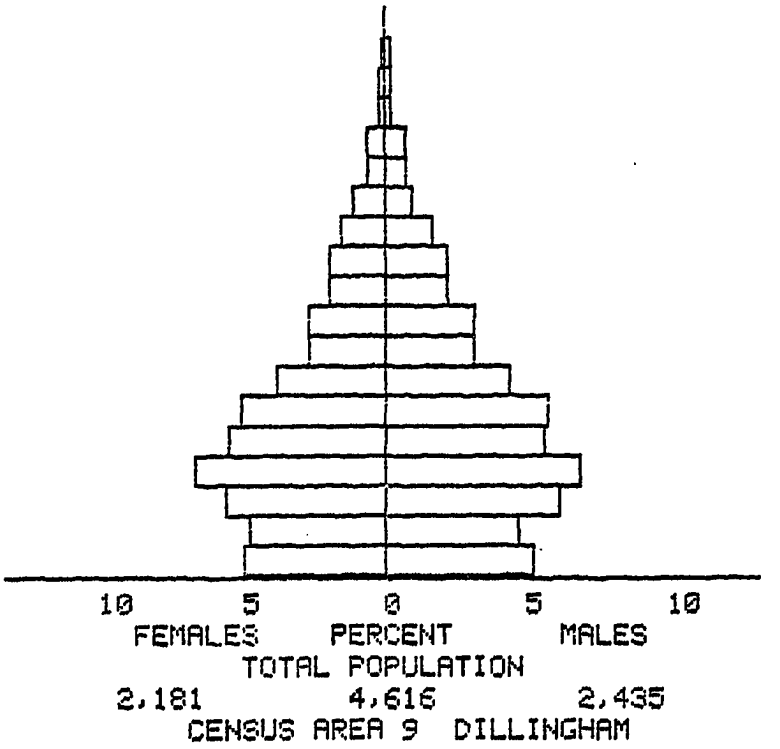


FIG. 8. POPULATION PYRAMIDS FOR CENSUS AREAS 7 AND 8



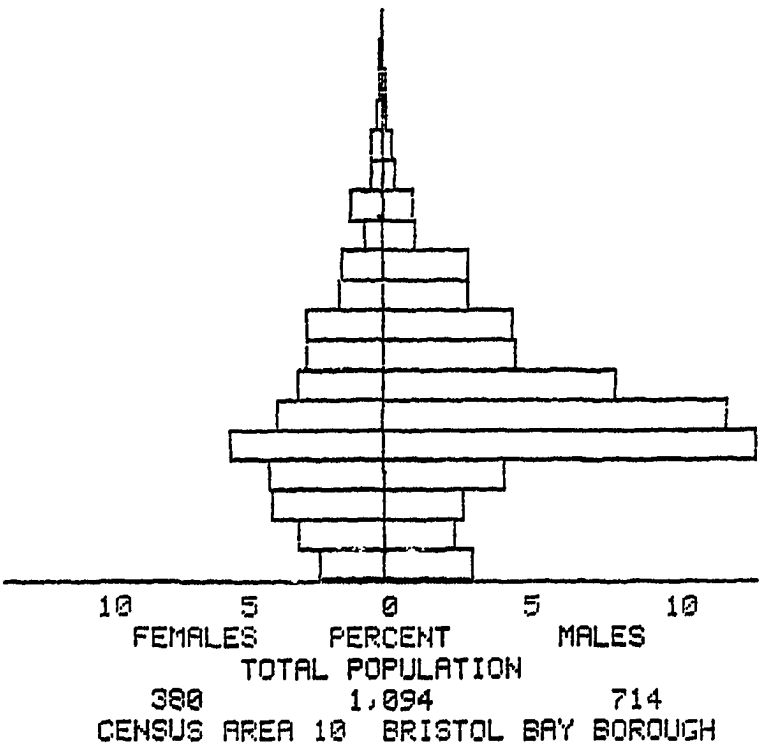


FIG. 9. POPULATION PYRAMIDS CENSUS AREAS 9 AND 10

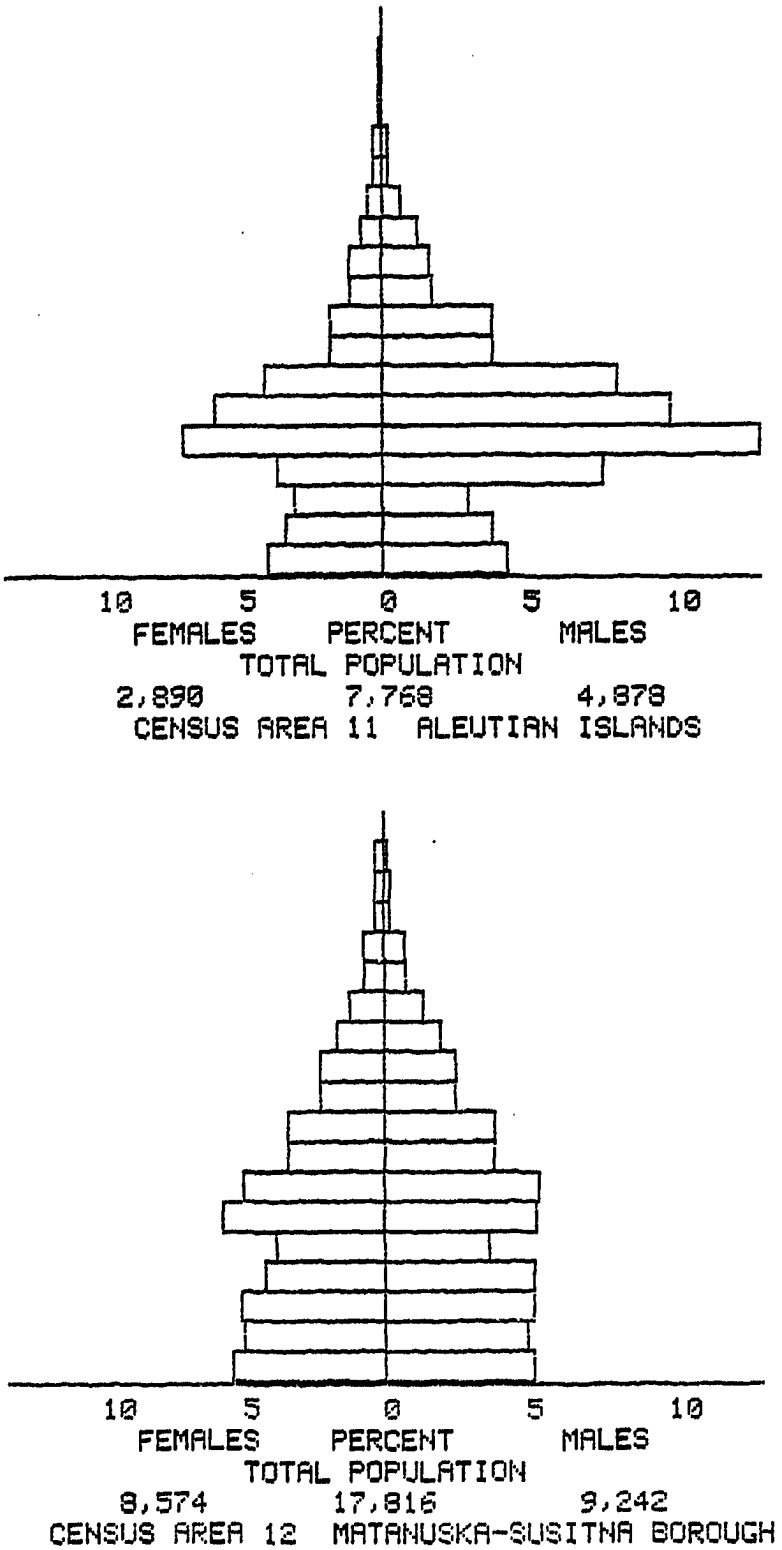
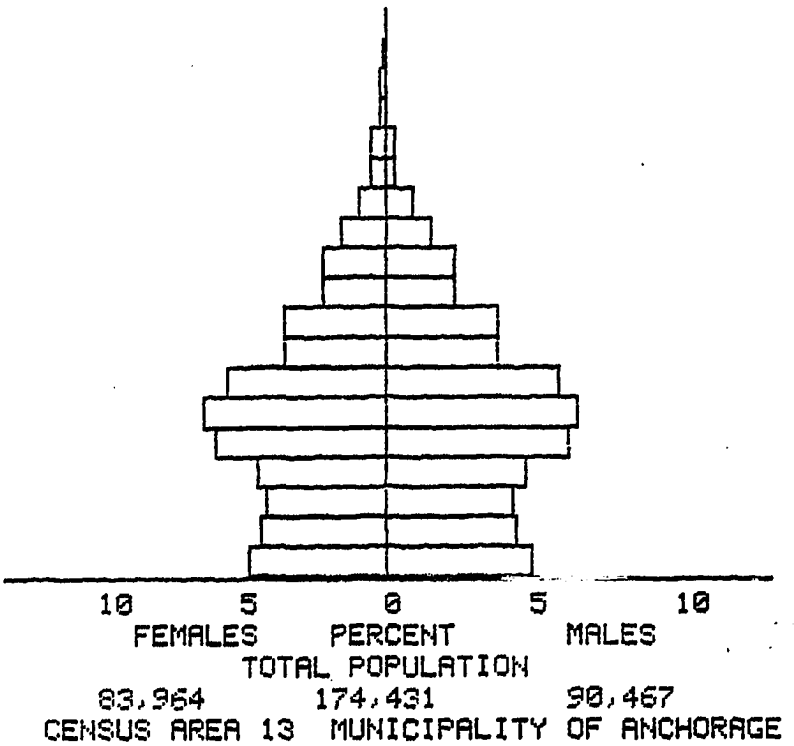


FIG. 10. POPULATION PYRAMIDS FOR CENSUS AREAS 11 AND 12



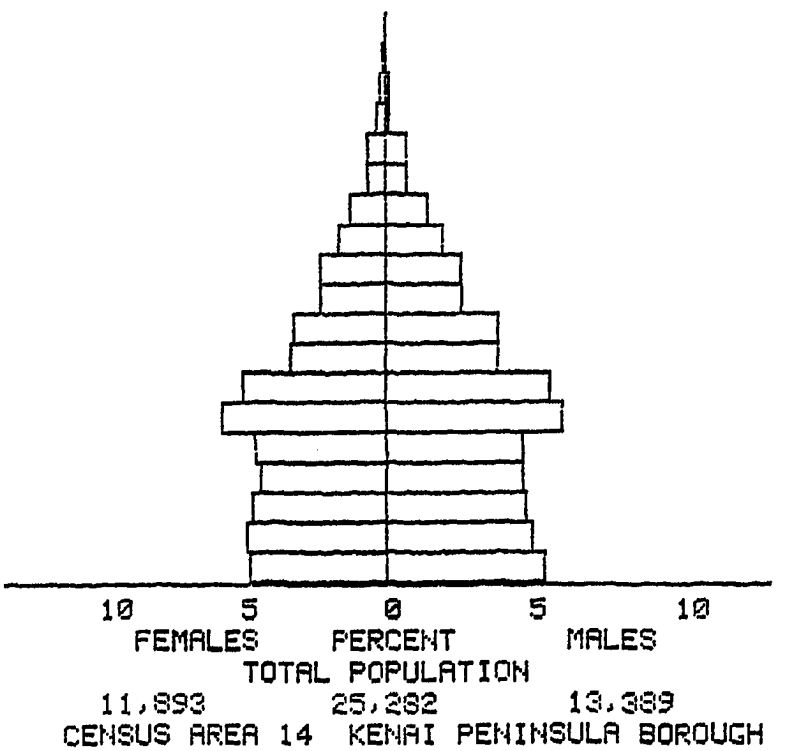
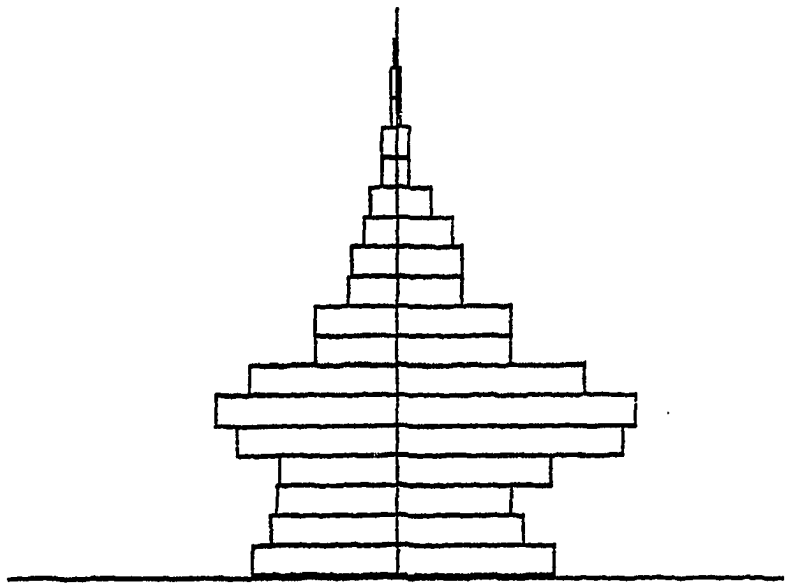


FIG. 11. POPULATION PYRAMIDS FOR CENSUS AREAS 13 AND 14



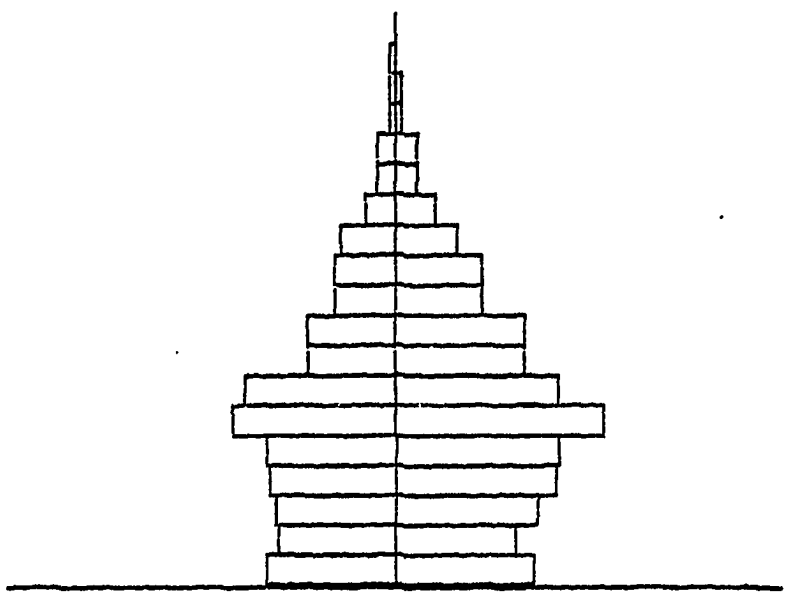


FIG. 12. POPULATION PYRAMIDS FOR CENSUS AREAS 15 AND 16

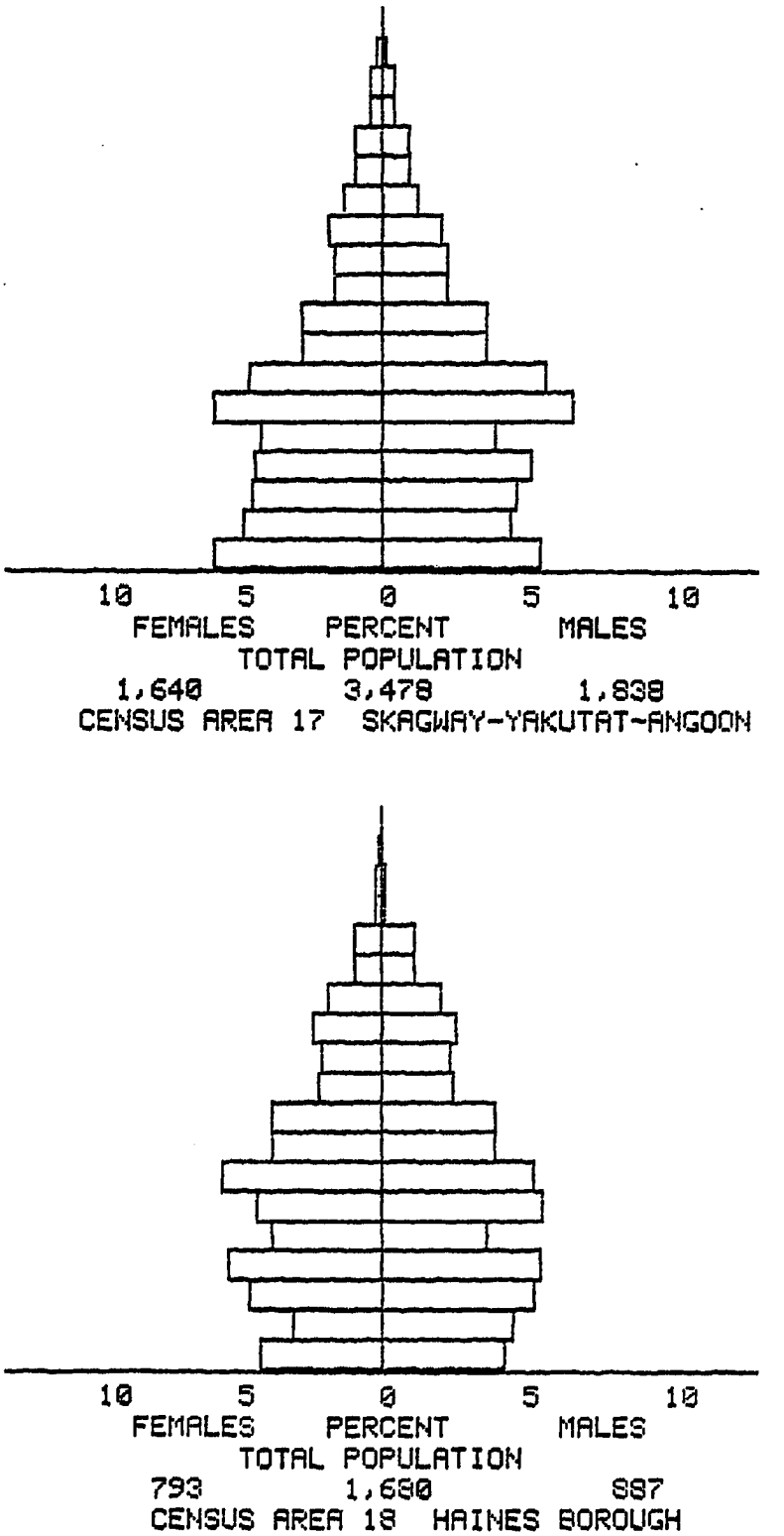
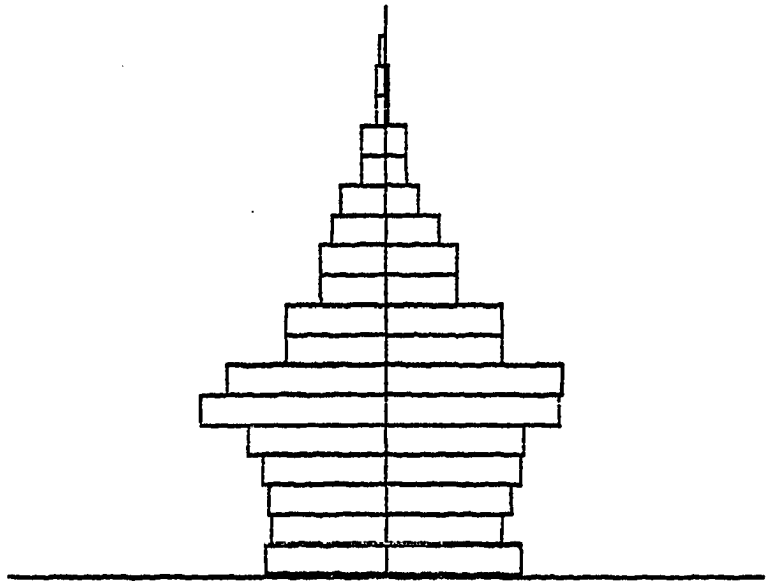


FIG. 13. POPULATION PYRAMIDS FOR CENSUS AREAS 17 AND 18



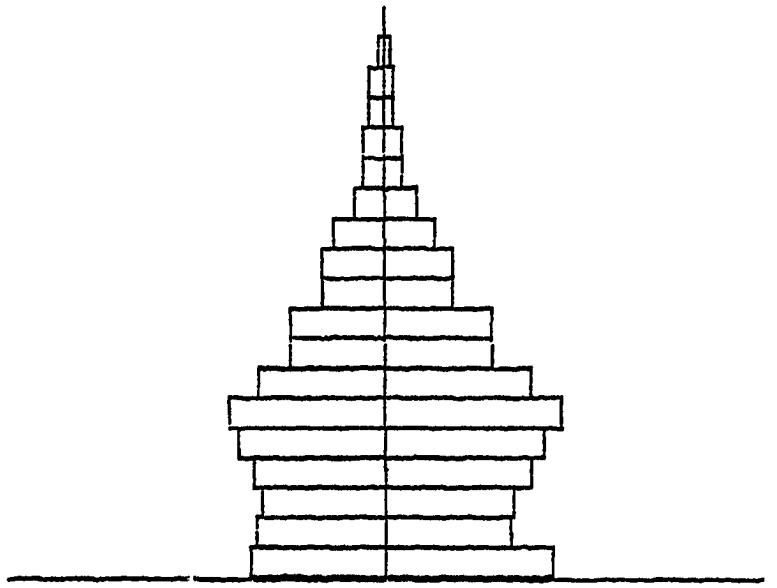
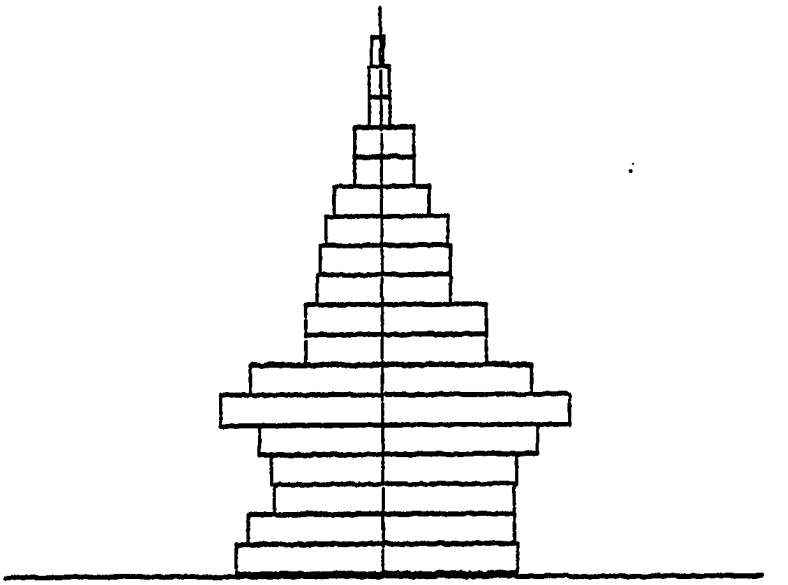


FIG. 14. POPULATION PYRAMIDS FOR CENSUS AREAS 19 AND 20



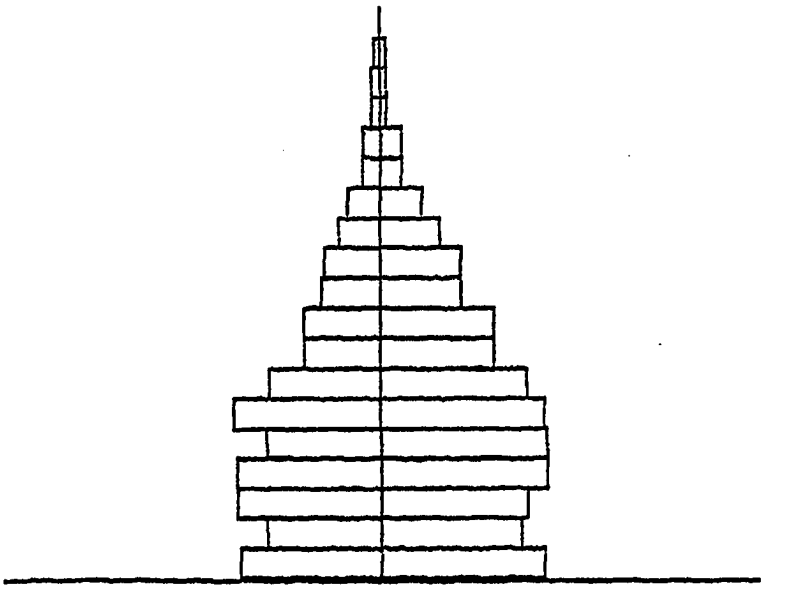


FIG. 15. POPULATION PYRAMIDS FOR CENSUS AREAS 21 AND 22

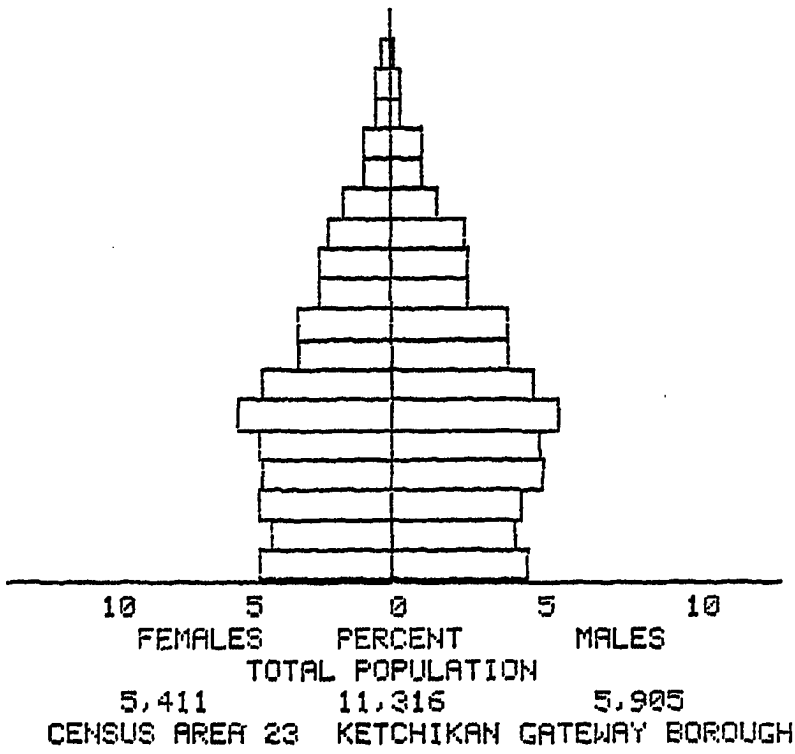


FIG. 16. POPULATION PYRAMID FOR CENSUS AREA 23

TABLE 3. CENSUS AREA POPULATIONS IN 1970 AND 1980

CENSUS AREA	POPULATION TOTAL 1980	POPULATION TOTAL 1970	INCREASE PERCENT 1970-1980
United States	226,504,825	203,302,031	11.4
Alaska	401,851	302,647	32.8
1. North Slope Borough	4,199	3,451	21.7
2. Kobuk	4,831	4,048	19.3
3. Nome	6,537	5,749	13.7
4. Yukon-Koyukuk	7,873	6,973	12.9
5. Fairbanks North Star Borough	53,983	45,864	17.7
6. Southeast Fairbanks	5,676	4,179	35.8
7. Wade Hampton	4,665	3,917	19.1
8. Bethel	10,999	8,873	24.0
9. Dillingham	4,616	3,827	20.6
10. Bristol Bay Borough	1,094	1,147	-4.6
11. Aleutian Islands	7,768	7,879	-1.4
12. Matanuska-Susitna Borough	17,816	6,509	173.7
13. Municipality of Anchorage	174,431	126,385	38.0
14. Kenai Peninsula Borough	25,282	16,586	52.4
15. Kodiak Island Borough	9,939	9,409	5.6
16. Valdez-Cordova	8,348	5,000	67.0
17. Skagway-Yakutat-Angoon	3,478	2,763	25.9
18. Haines Borough	1,680	1,401	19.9
19. Juneau Borough	19,528	13,556	44.1
20. Sitka Borough	7,803	6,073	28.5
21. Wrangell-Petersburg	6,167	4,949	24.6
22. Prince of Wales-Outer Ketchikan	3,822	3,782	1.1
23. Ketchikan Gateway Borough	11,316	10,041	12.7

*1970 figures from Harrison (1981)

TABLE 4. CENSUS AREA POPULATION CHARACTERISTICS IN 1980

CENSUS AREA	PERCENT NATIVE	PERCENT UNDER 15 YEARS	SEX RATIO
United States - 1967		30.3	.96
Alaska	16.0	26.9	1.13
1. North Slope Borough	76.8	27.6	1.31
2. Kobuk	85.1	33.9	1.16
3. Nome	79.2	32.0	1.19
4. Yukon-Koyukuk	55.4	28.4	1.35
5. Fairbanks North Star Borough	5.5	26.3	1.16
6. Southeast Fairbanks	12.8	30.1	1.26
7. Wade Hampton	93.2	37.6	1.10
8. Bethel	84.1	33.5	1.12
9. Dillingham	76.3	30.2	1.12
10. Bristol Bay Borough	32.9	17.0	1.88
11. Aleutian Islands	24.9	21.0	1.69
12. Matanuska-Susitna Borough	3.9	29.6	1.08
13. Municipality of Anchorage	7.9	26.1	1.08
14. Kenai Peninsula Borough	6.9	28.4	1.13
15. Kodiak Island Borough	18.9	25.9	1.26
16. Valdez-Cordova	12.7	25.1	1.25
17. Skagway-Yakutat-Angoon	42.0	29.0	1.12
18. Haines Borough	12.7	25.2	1.12
19. City and Borough of Juneau	11.2	24.5	1.05
20. Sitka Borough	21.4	27.3	1.12
21. Wrangell-Petersburg	19.3	26.7	1.16
22. Prince of Wales-Outer Ketchikan	43.2	28.7	1.27
23. Ketchikan Gateway Borough	12.4	25.4	1.09

cipality of Anchorage, the effect is much less noticeable due to a much greater civilian population.

COMMUNITIES

The demographic patterns of census areas are difficult to interpret because of the number and variety of communities within each area. Communities themselves, or technically Census Designated Places (CDP), are units more amenable to analysis. Communities provide the most direct needs of the inhabitants: emotional, economic, and physical. In a region as large as a census area, it is difficult to discern what factors may be an incentive to people to move to or from an area. Some localities may be attracting residents while others are declining in population. Communities can be classified simply as either growing or declining, and the population characteristics of each community can be examined to determine which population characteristics are associated with population growth or decline.

Twenty-five communities were selected for further analysis. Twelve were randomly selected from the statistical population of primarily native villages (over 40% native) using a pseudo-random number generator. Six urban areas were selected to test for trends in urbanization. Another seven smaller communities were selected to add some areas left out by the random sample and to provide communities where additional information might be available from informants. Summary statistics for the communities examined are in Tables 5 and 6. Population pyramids for these communities are in Figures 17-41.

TABLE 5. COMMUNITY POPULATIONS IN 1970 AND 1980

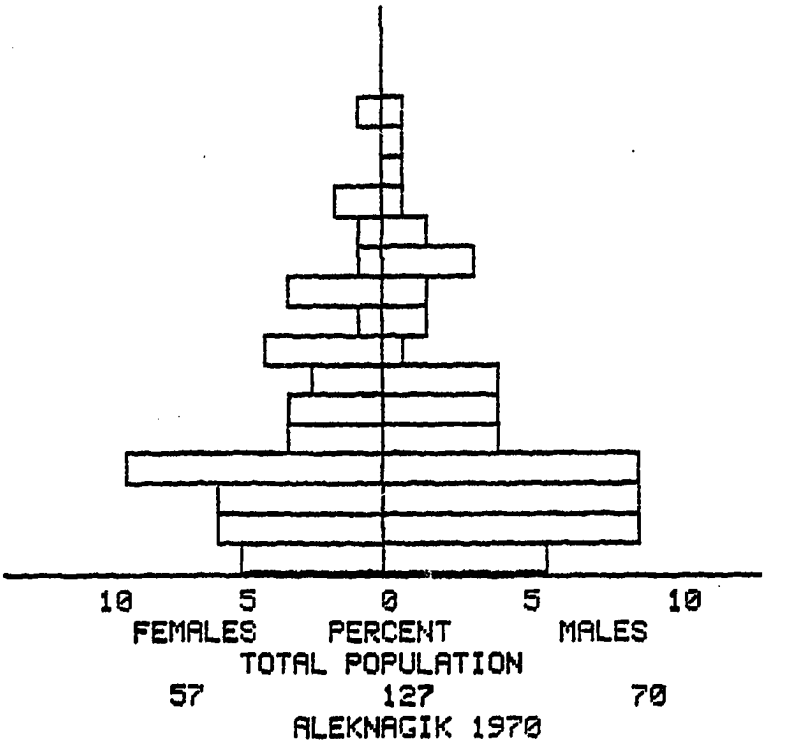
COMMUNITY	CENSUS AREA	POPULATION 1980	PERCENT NATIVE 1980	POPULATION 1970	PERCENT NATIVE 1970
Aleknagik	9	154	90	128	79
Anaktuvuk Pass	1	203	94	99	98
Anchorage	13	174,431	5	48,209*	5
Barrow	1	2,207	78	2,104	91
Bethel	8	3,576	68	2,416	77
Chalkyitsik	4	100	96	130	95
Chignik Lake	9	138	89	117	98
Deering	2	150	92	85	98
Fairbanks	5	22,645	7	14,771*	6
Gambell	3	445	96	372	96
Huslia	4	188	95	159	95
Iliamna	9	94	40	58	40
Juneau	19	19,528	11	6,050	20
Kiana	2	345	94	278	96
Kotzebue	2	2,054	77	1,696	79
Koyukuk	4	98	93	124	98
Kwigillingok	8	354	97	148	98
Metlakatla	22	1,056	86	1,050	81
Mountain Village	7	583	92	419	94
Nenana	4	470	46	362	39
Point Hope	1	464	94	386	96
Scammon Bay	7	250	96	166	100
Stebbins	3	331	95	231	97
Stony River	8	62	90	74	82
Venetie	4	132	98	112	96

*Census boundaries changed from 1970 to 1980

TABLE 6. COMMUNITY POPULATION GROWTH AND SEX RATIOS IN 1970 AND 1980

COMMUNITY	1 PERCENT INCREASE 1970-80	2 SEX RATIO 1980	3 SEX RATIO 1970
Aleknagik	20	1.26	1.25
Anaktuvuk Pass	105	.99	1.30
Barrow	5	1.16	1.09
Bethel	48	1.08	.99
Chalkyitsik	-23	1.33	1.13
Chignik Lake	18	1.16	1.13
Deering	77	1.14	.93
Gambell	20	1.38	1.19
Huslia	18	1.27	1.12
Iliamna	62	.96	1.42
Kiana	24	1.14	.90
Kotzebue	21	1.12	.99
Koyukuk	-21	1.26	1.00
Kwigillingok	139	1.08	.97
Metlakatla	1	1.14	1.22
Mountain Village	39	1.08	1.04
Nenana	30	1.22	1.23
Point Hope	20	1.16	1.28
Scammon Bay	51	1.10	1.08
Stebbins	43	1.01	1.18
Stony River	-16	1.14	.90
Venetie	18	1.24	1.04
Mean (n=22)	32	1.16	1.11

Correlation Coefficient for Column 1 and Column 2 = -.598
Significant at the .01 level.



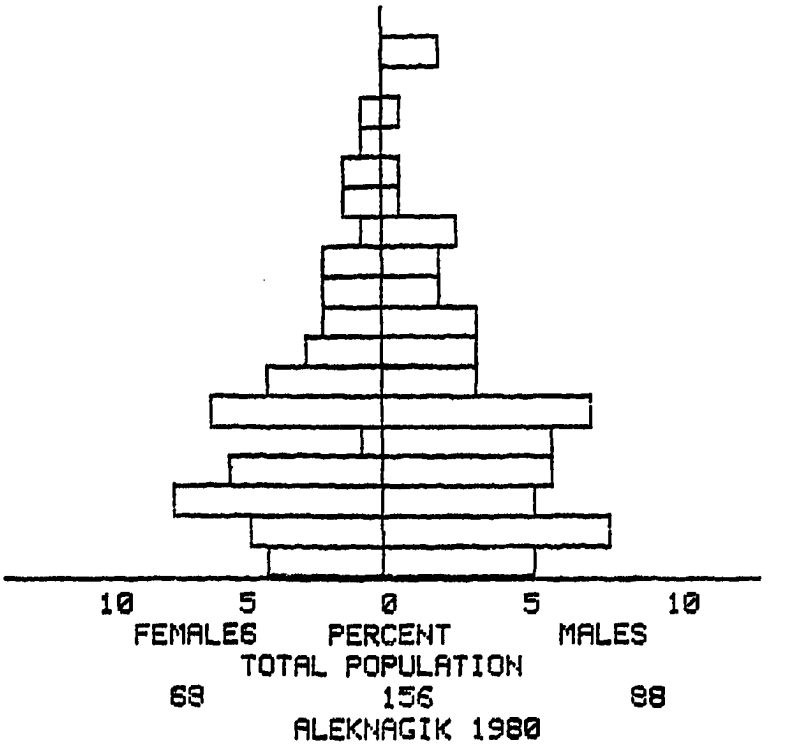
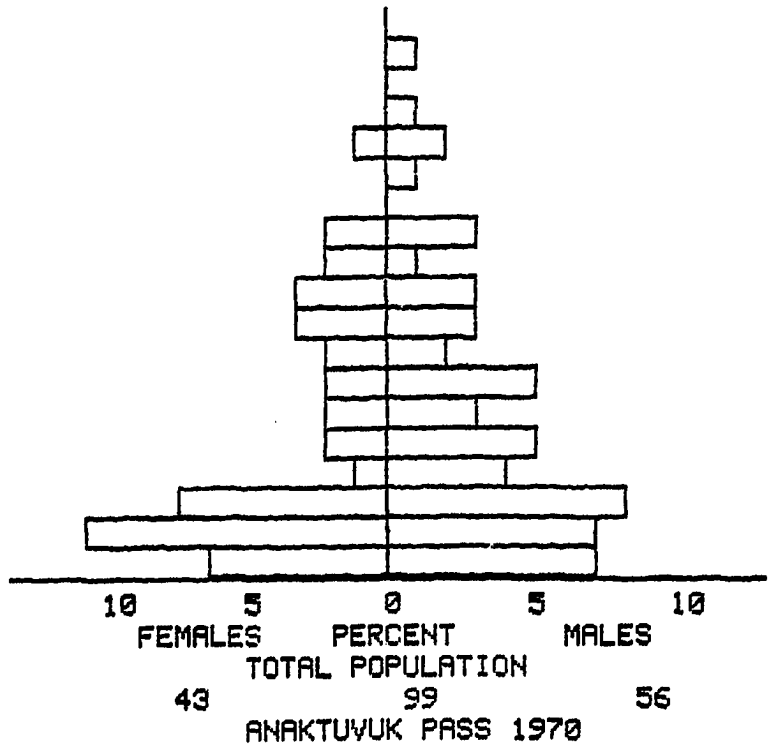


FIG. 17. POP'!LATION PYRAMIDS FOR ALEKNAGIK IN 1970 AND 1980



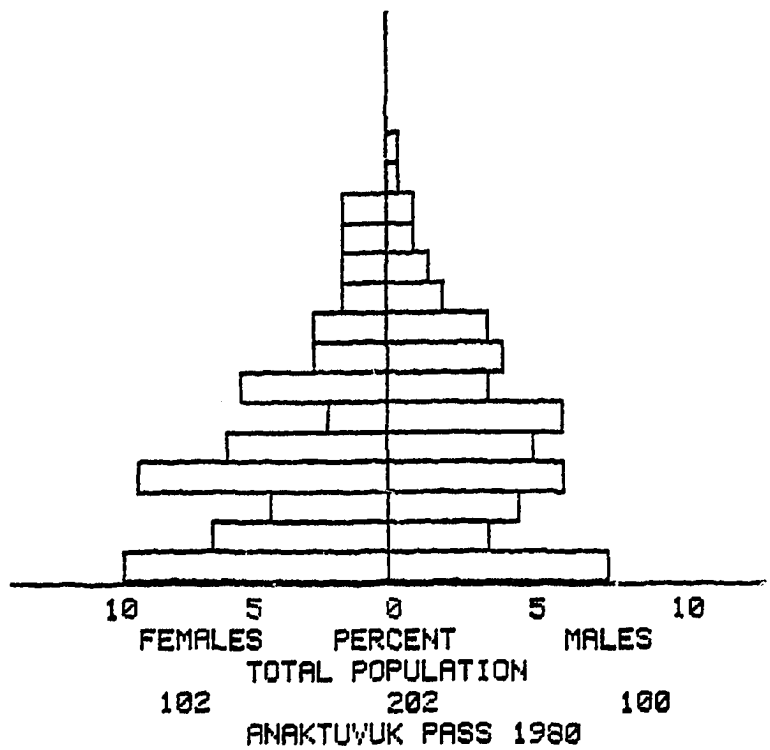
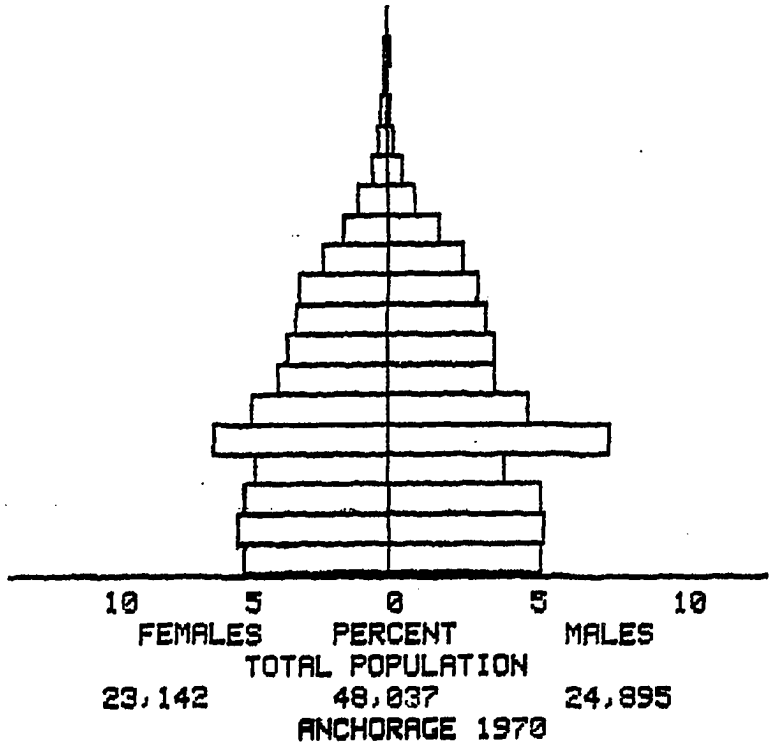


FIG. 18. POPULATION PYRAMIDS FOR ANAKTUVUK PASS IN 1970 AND 1980



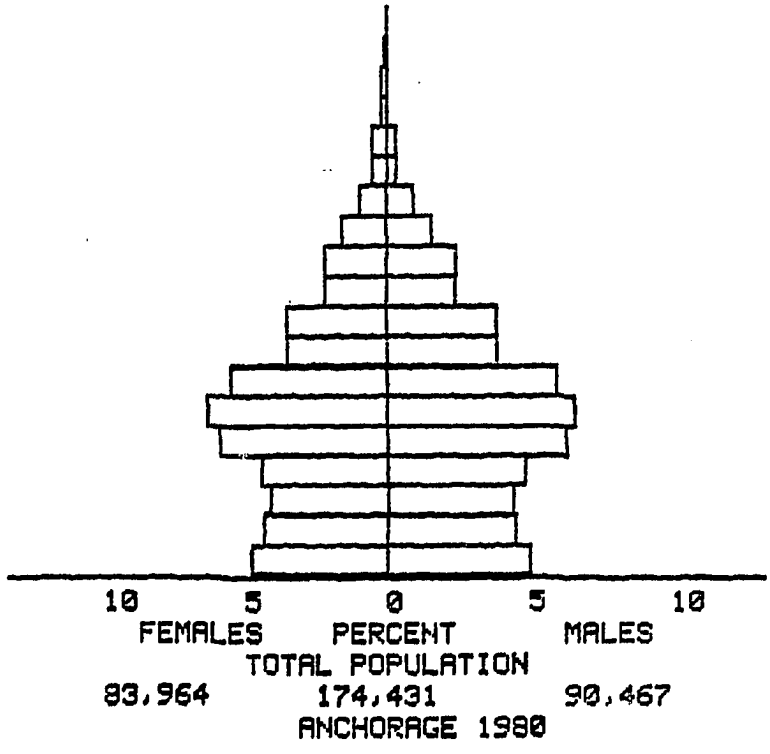
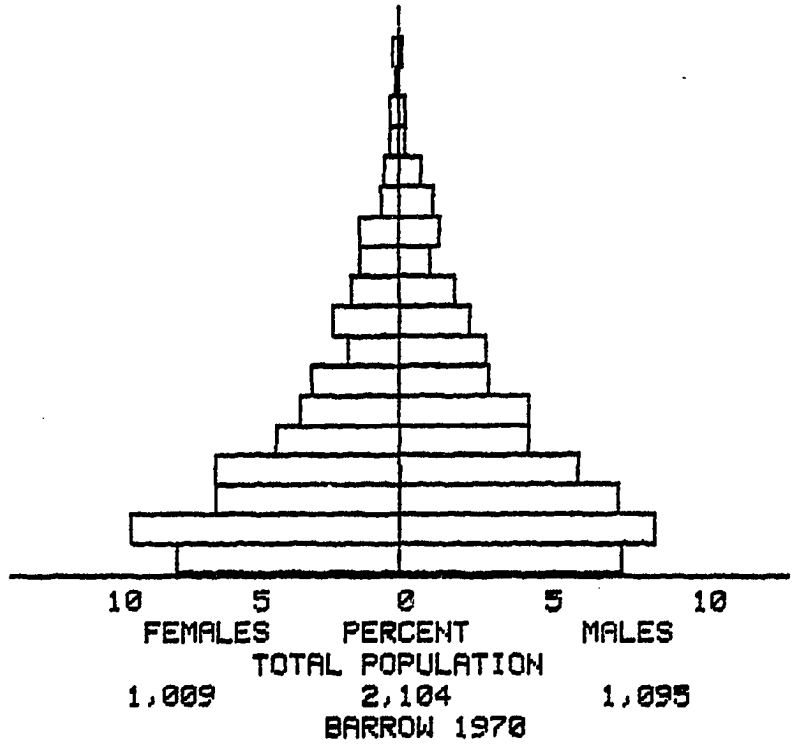


FIG. 19. POPULATION PYRAMIDS FOR ANCHORAGE IN 1970 AND 1980



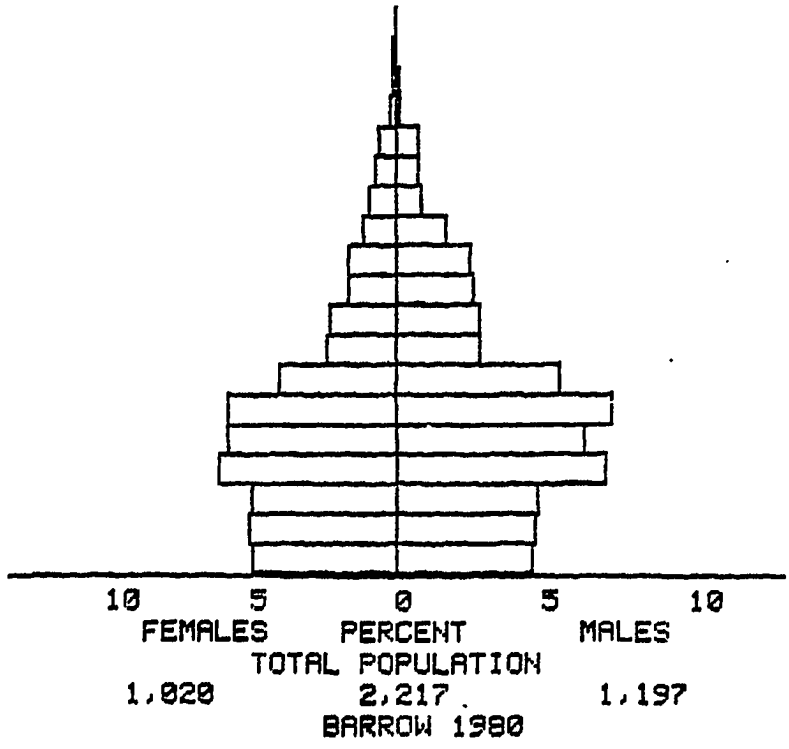
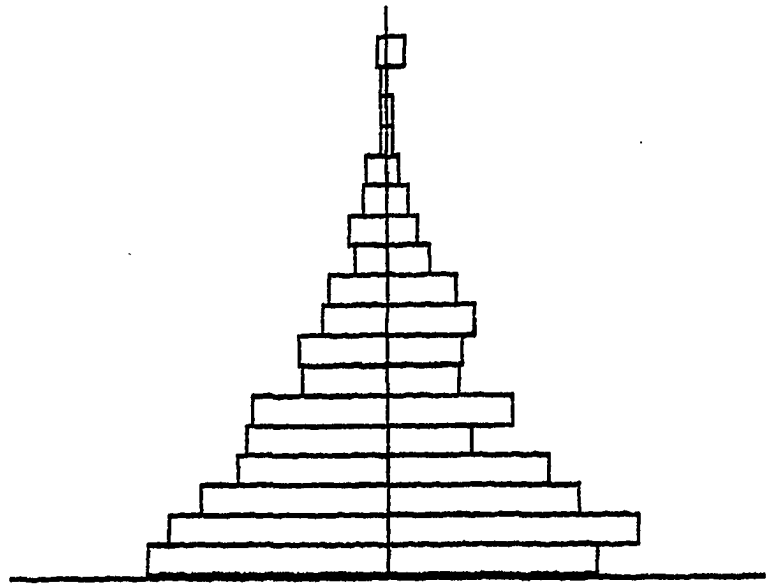


FIG. 20. POPULATION PYRAMIDS FOR BARROW IN 1970 AND 1980



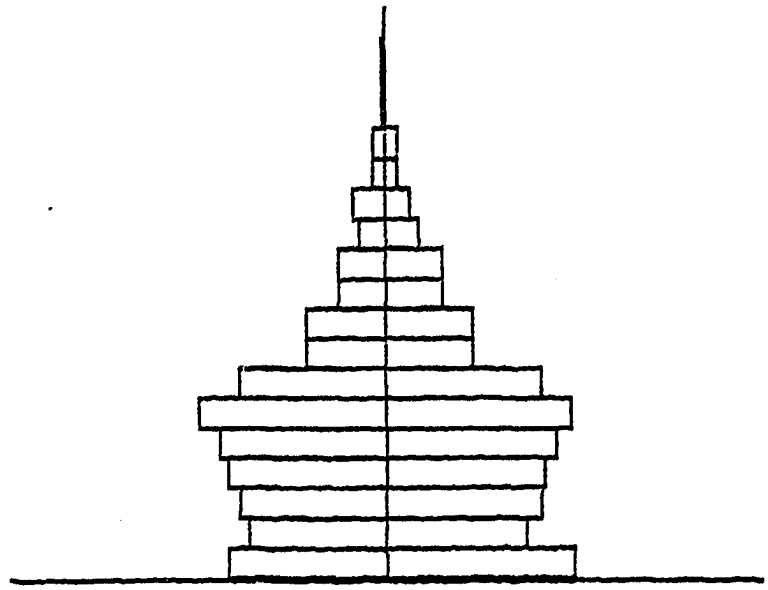


FIG. 21. POPULATION PYRAMIDS FOR BETHEL IN 1970 AND 1980

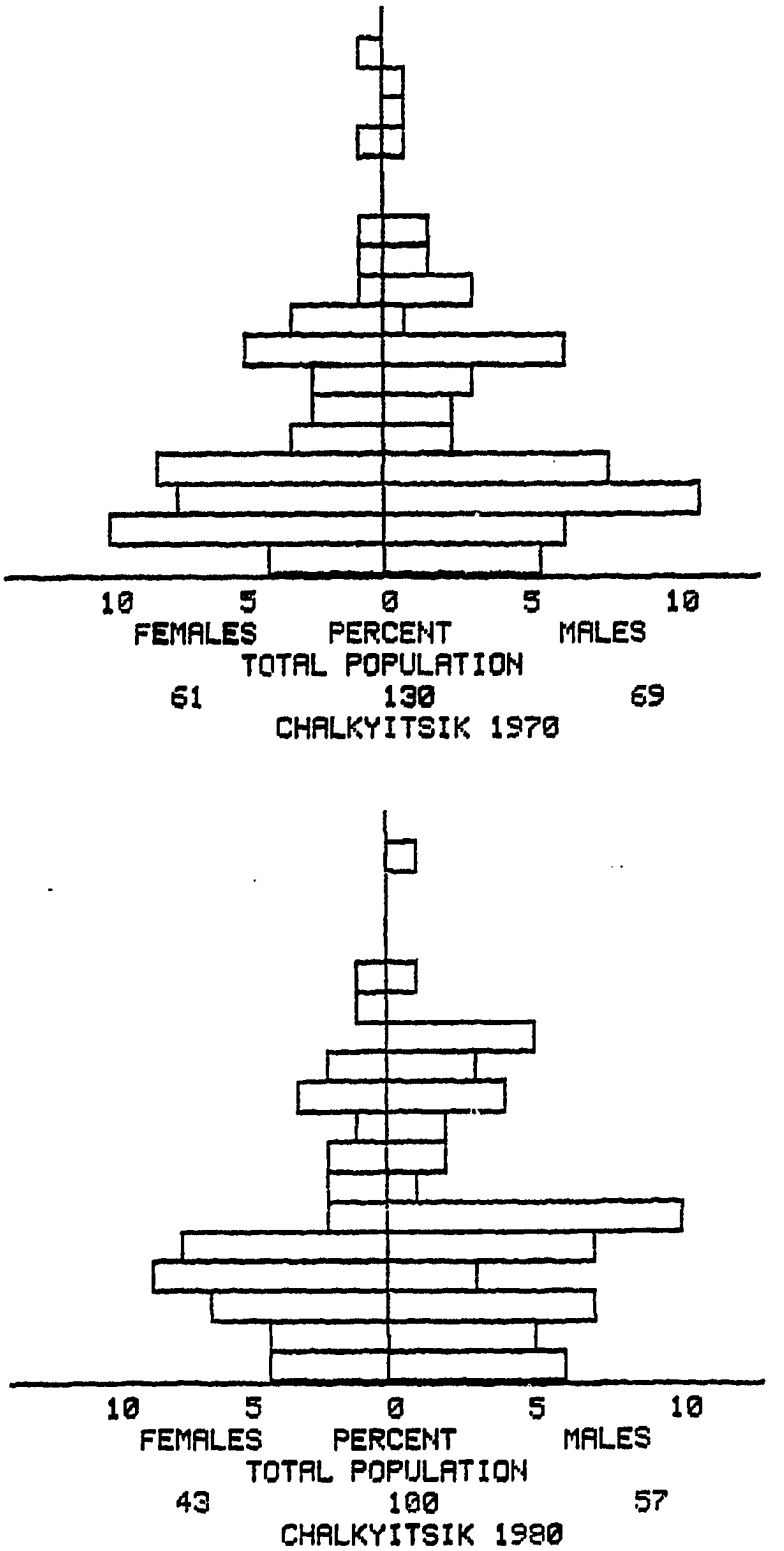
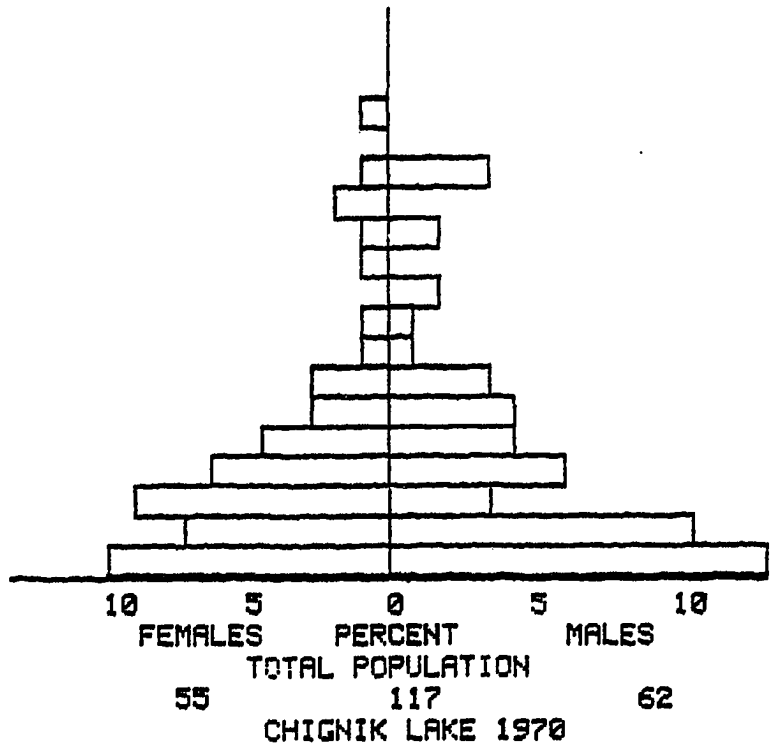


FIG. 22. POPULATION PYRAMIDS FOR CHALKYITSIK IN 1970 AND 1980



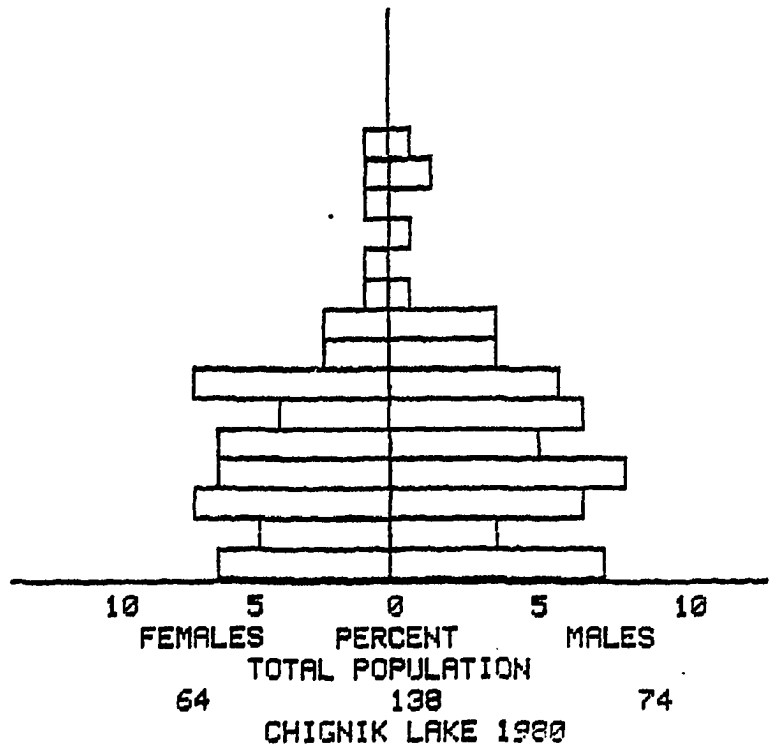


FIG. 23. POPULATION PYRAMIDS FOR CHIGNIK LAKE IN 1970 AND 1980

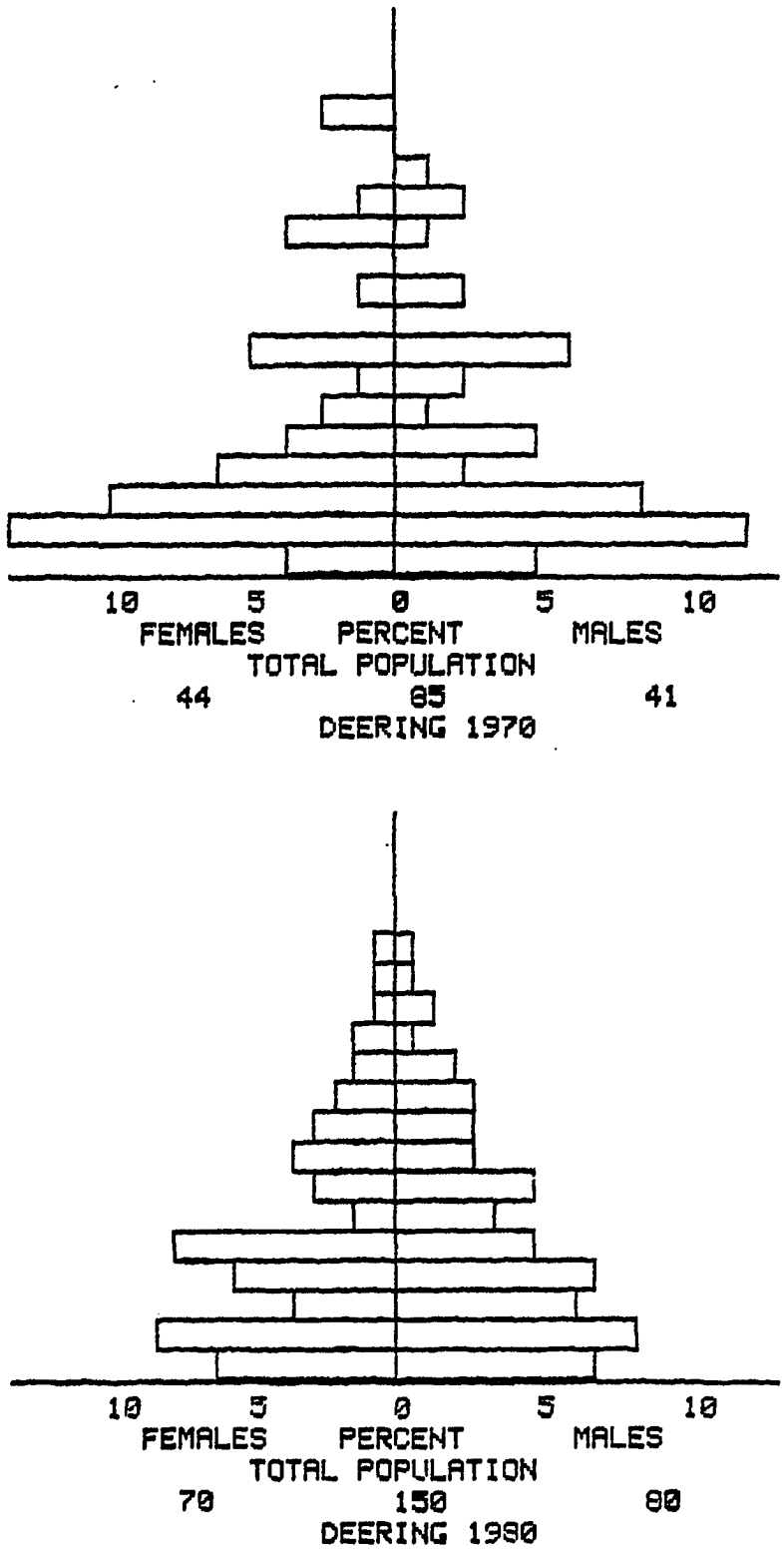
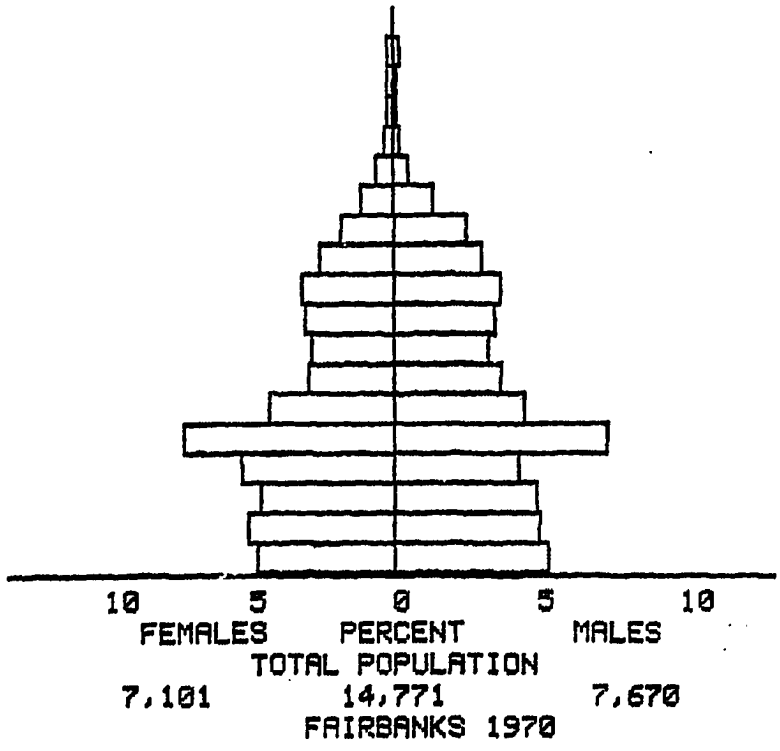


FIG. 24. POPULATION PYRAMIDS FOR DEERING IN 1970 AND 1980



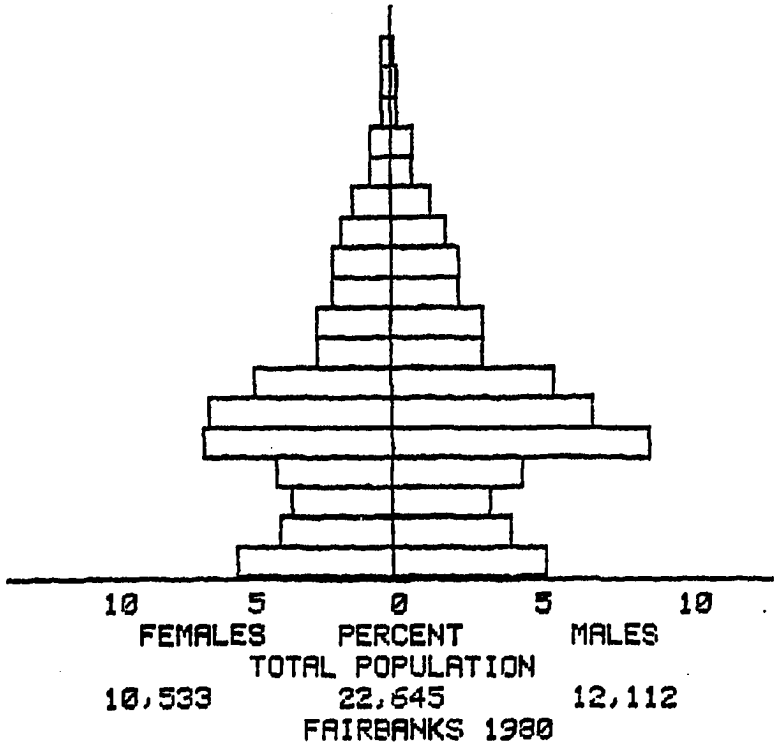
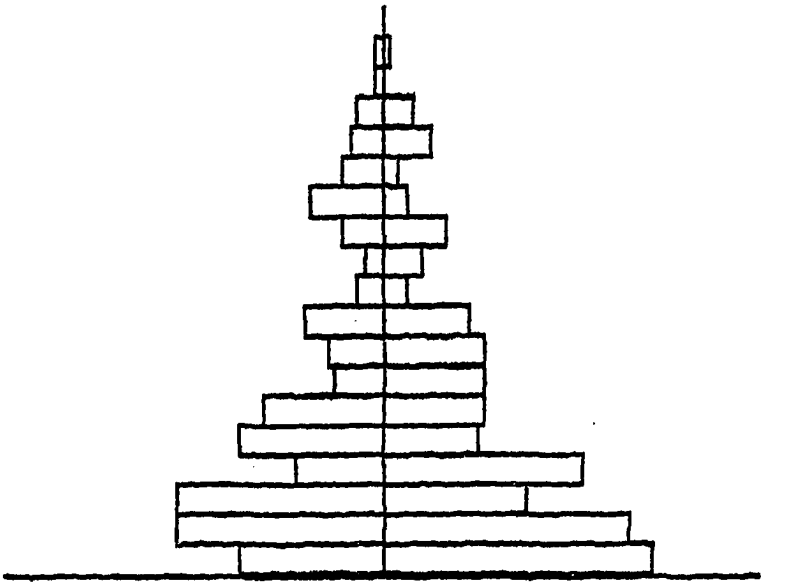


FIG. 25. POPULATION PYRAMIDS FOR FAIRBANKS IN 1970 AND 1980



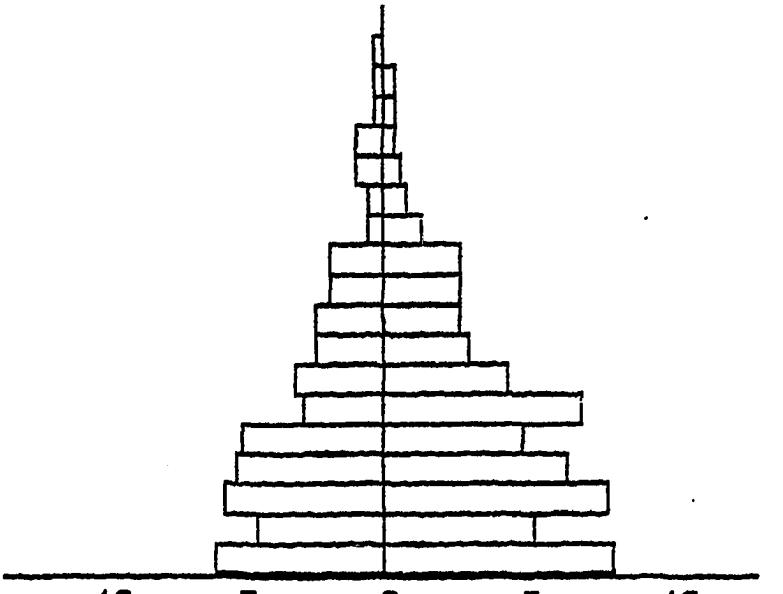
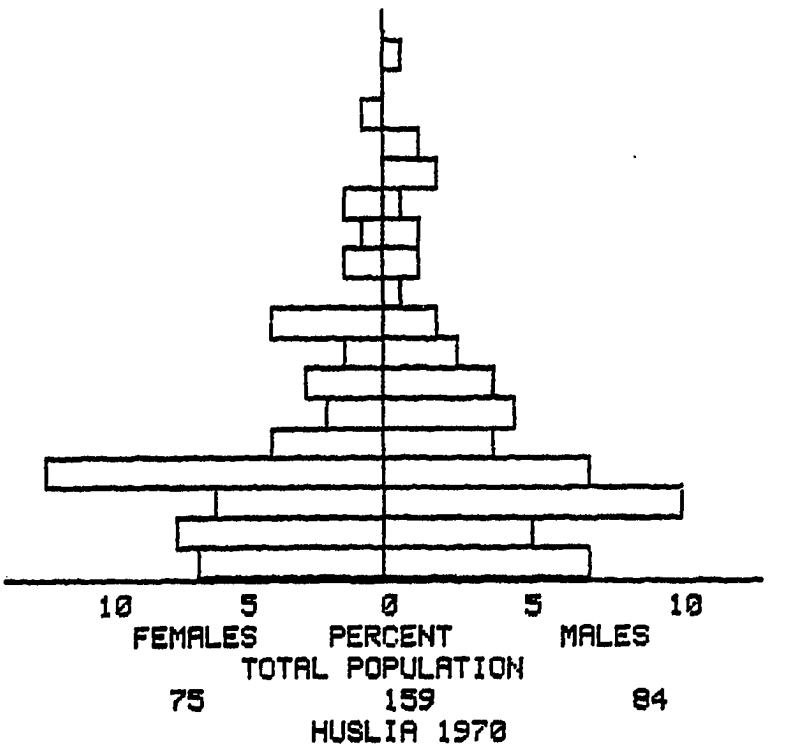


FIG. 26. POPULATION PYRAMIDS FOR GAMBELL IN 1970 AND 1980



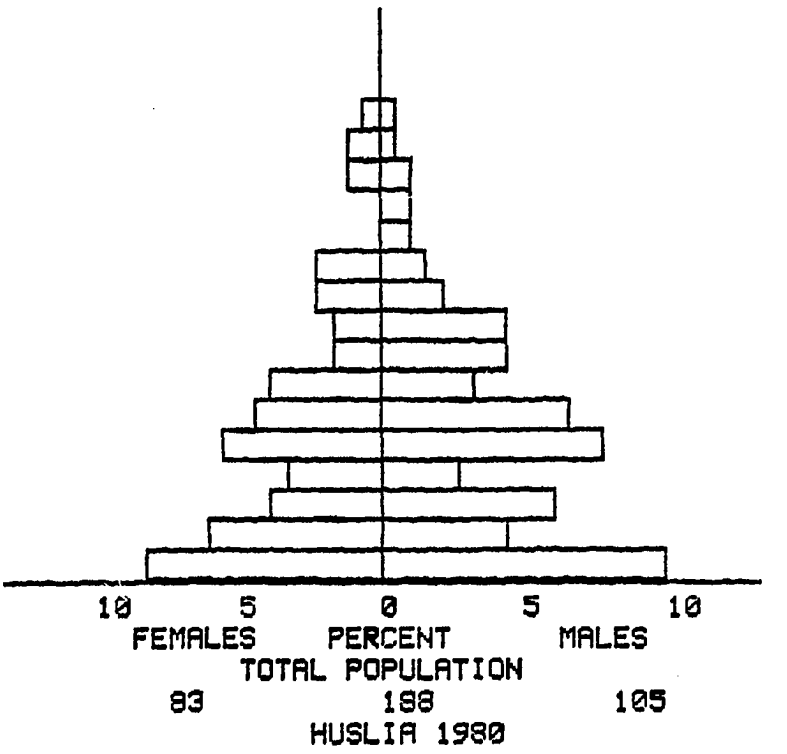


FIG. 27. POPULATION PYRAMIDS FOR HUSLIA IN 1970 AND 1980

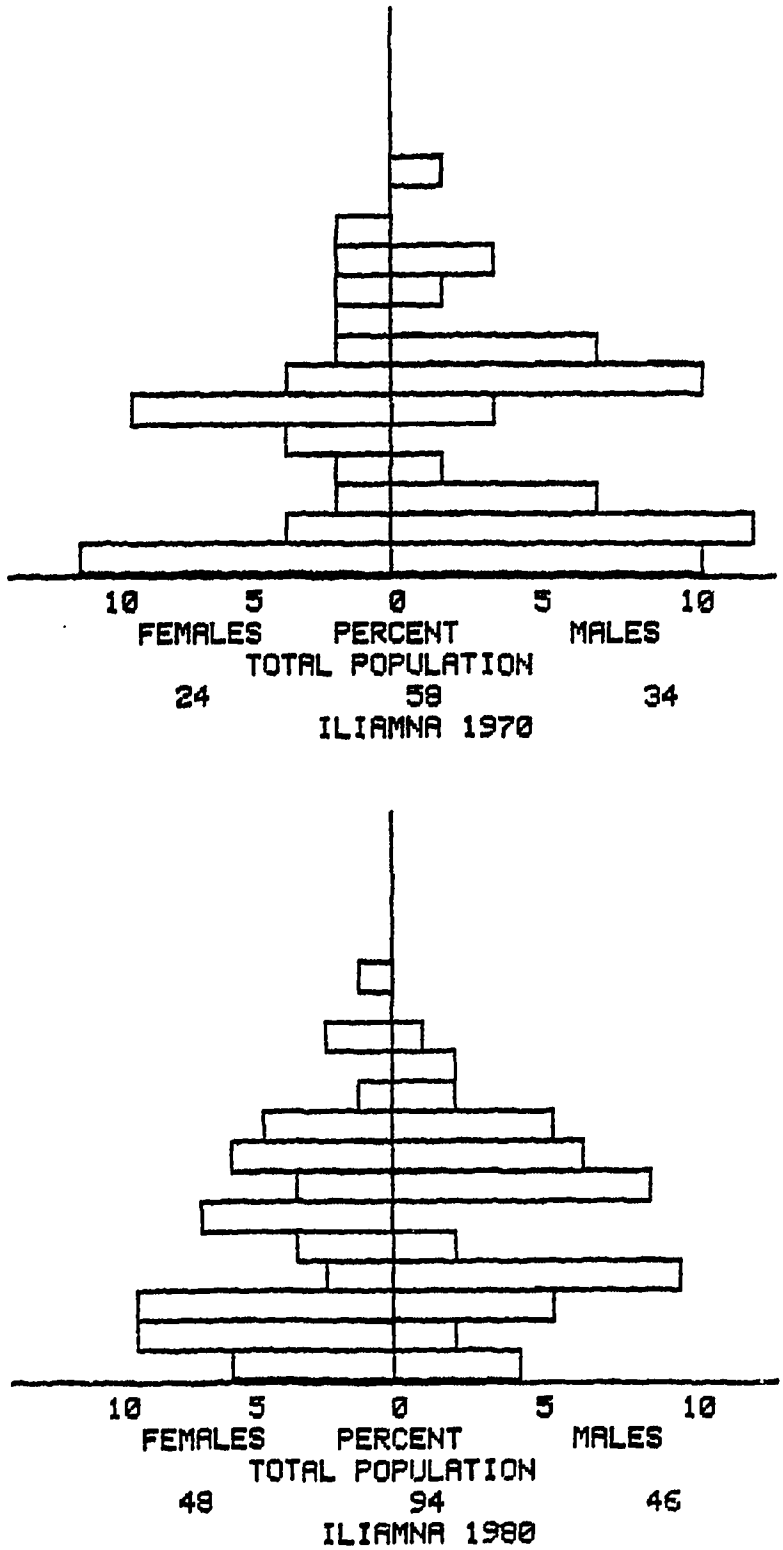
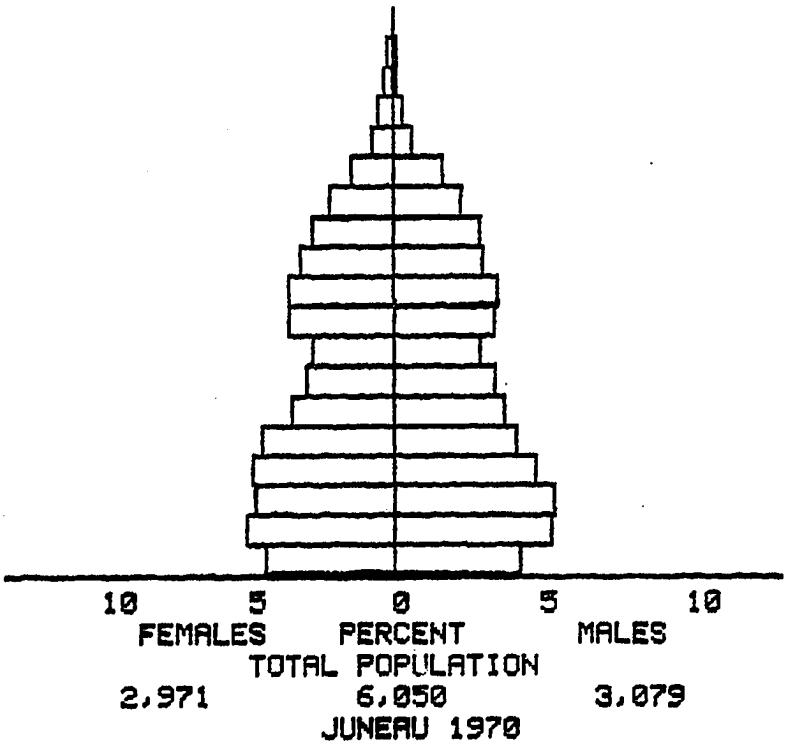


FIG. 28. POPULATION PYRAMIDS FOR ILIAMNA IN 1970 AND 1980



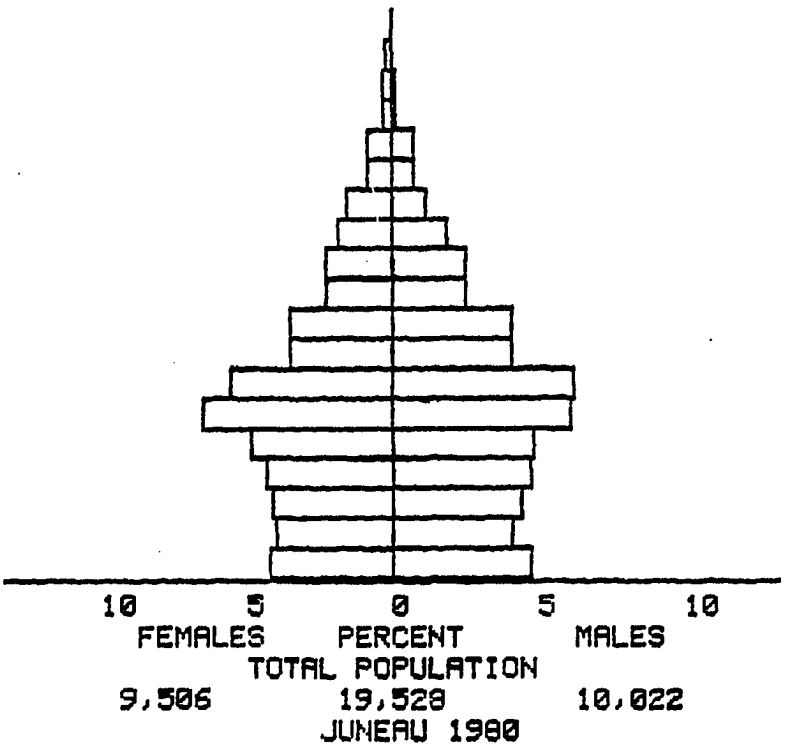


FIG. 29. POPULATION PYRAMIDS FOR JUNEAU IN 1970 AND 1980

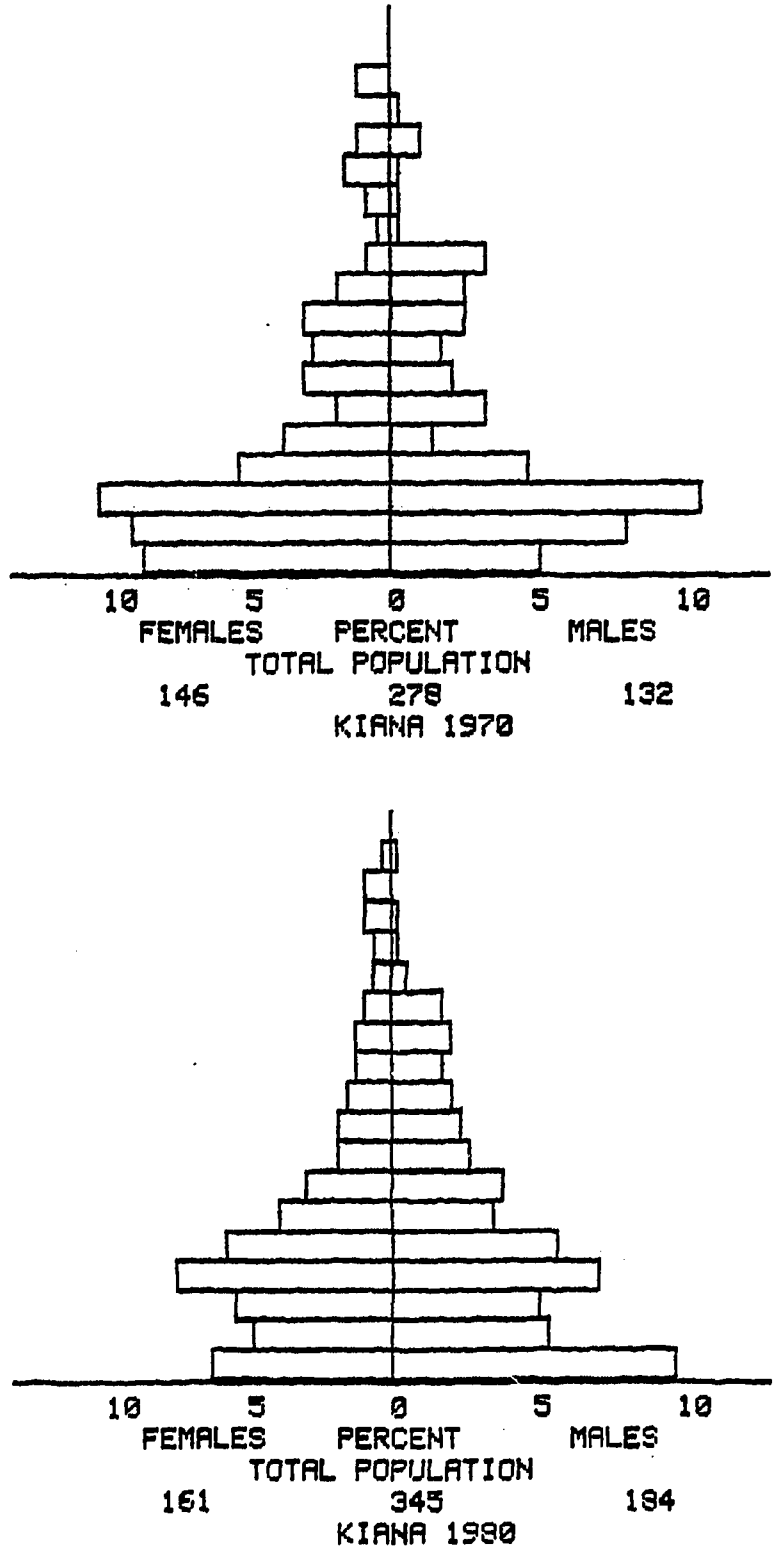


FIG. 30. POPULATION PYRAMIDS FOR KIANA IN 1970 AND 1980

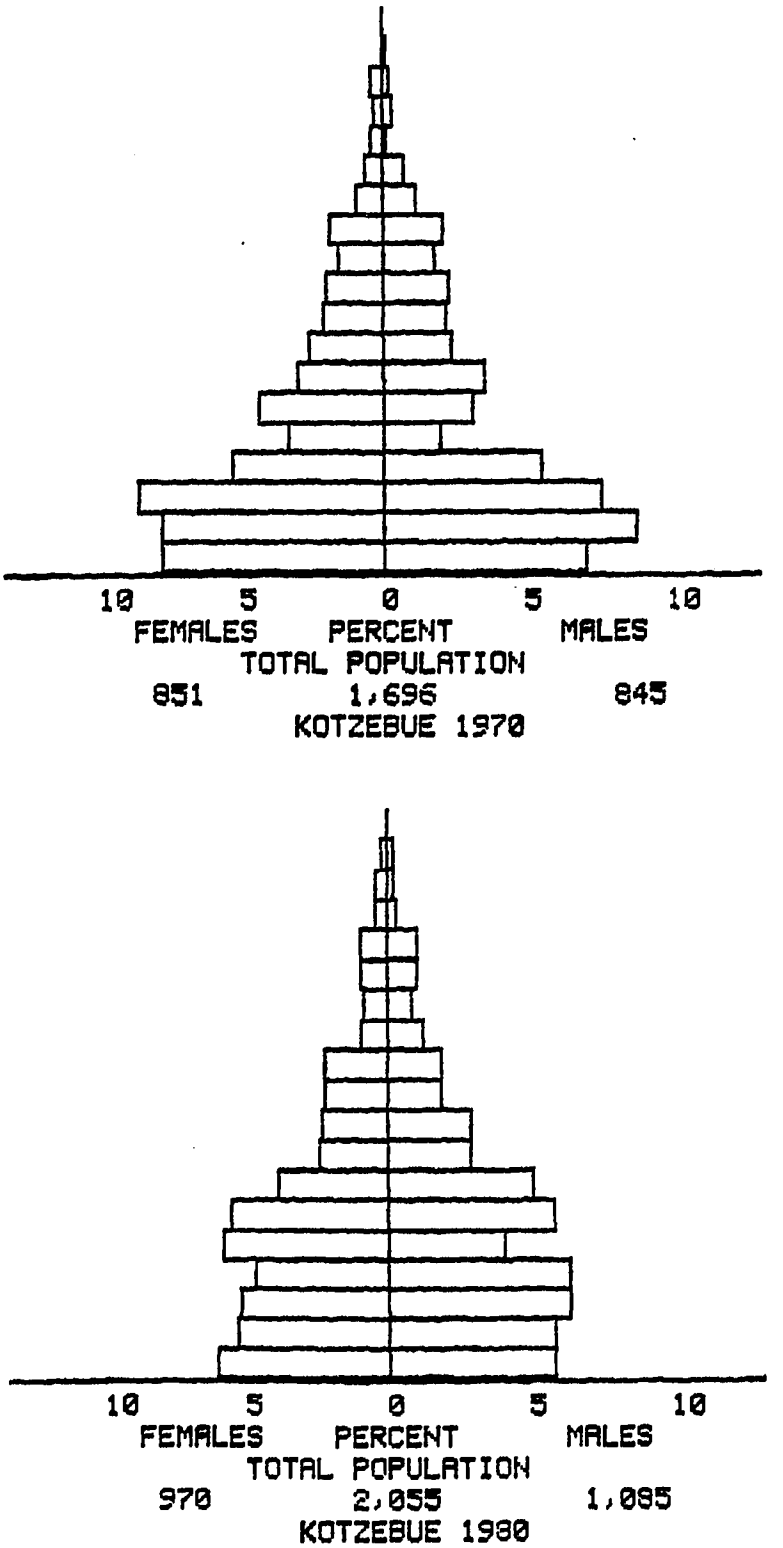
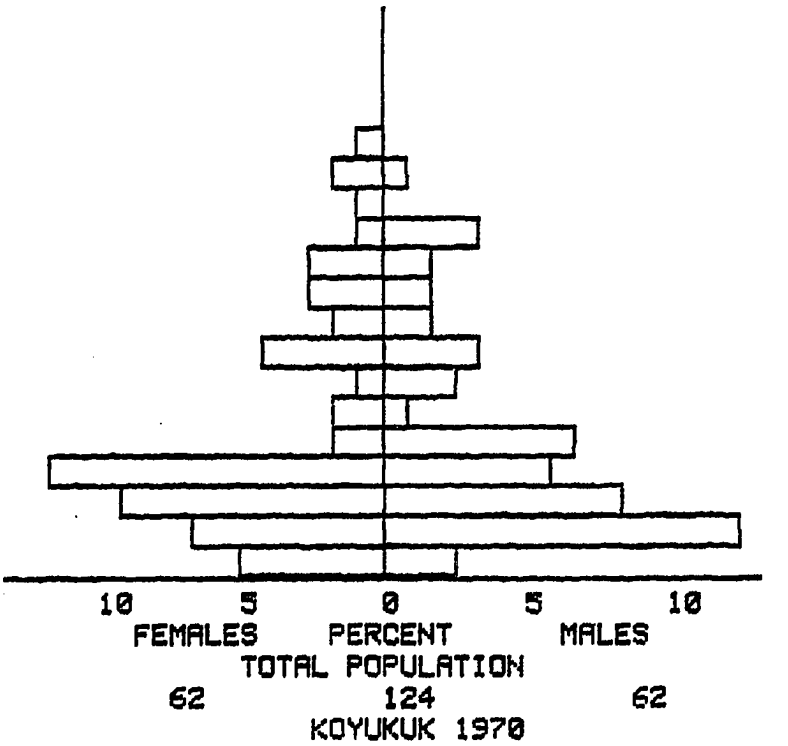


FIG. 31. POPULATION PYRAMIDS FOR KOTZEBUE IN 1970 AND 1980



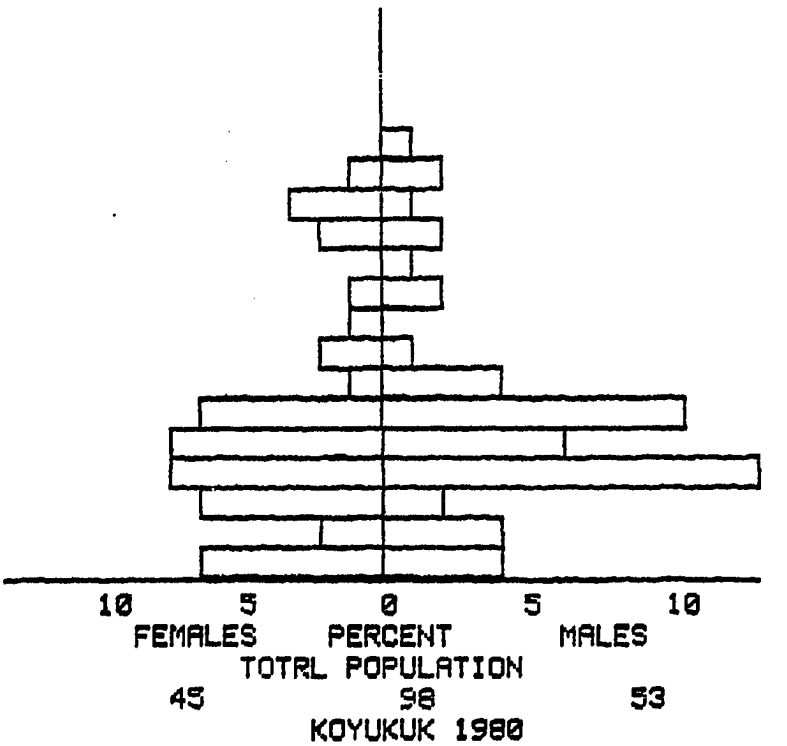
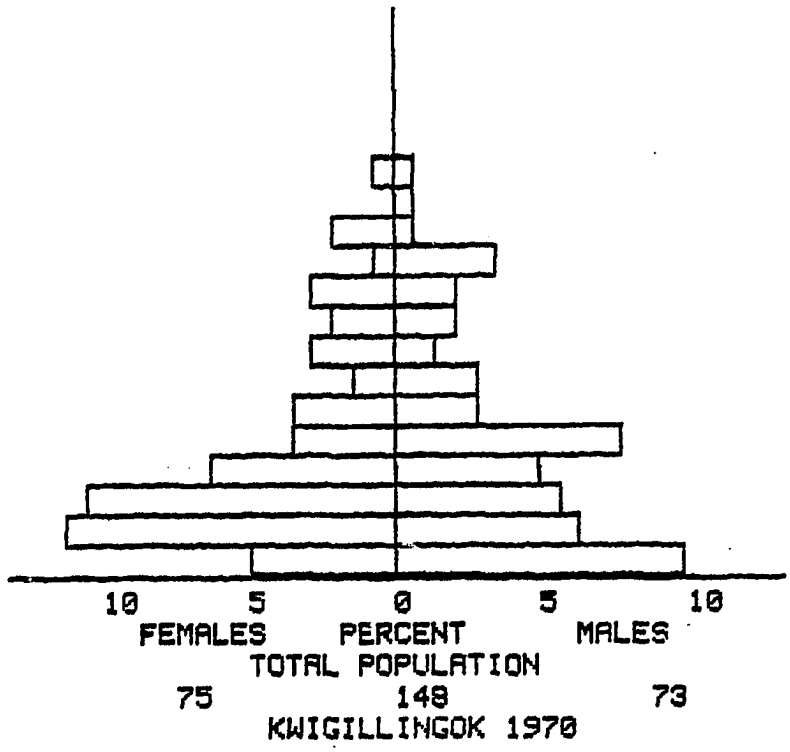


FIG. 32. POPULATION PYRAMIDS FOR KOYUKUK IN 1970 AND 1980



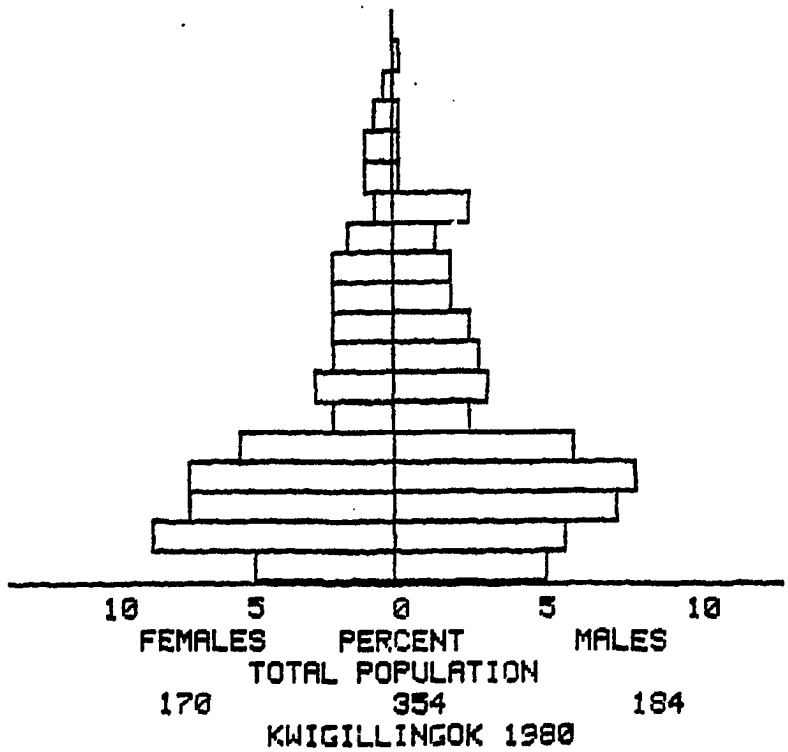


FIG. 33. POPULATION PYRAMIDS FOR KWIGILLINGOK IN 1970 AND 1980

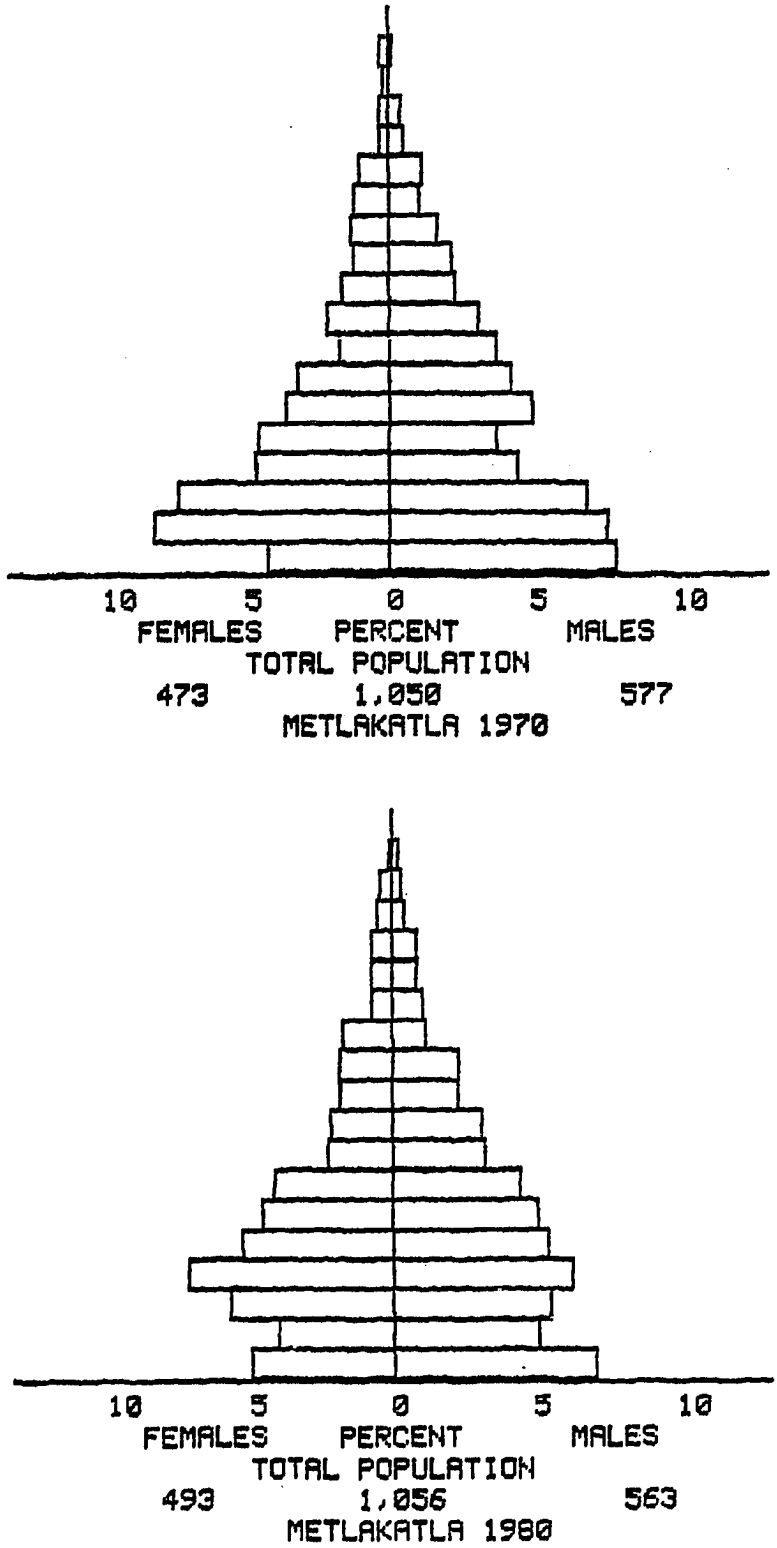


FIG. 34. POPULATION PYRAMIDS FOR METLAKATLA IN 1970 AND 1980

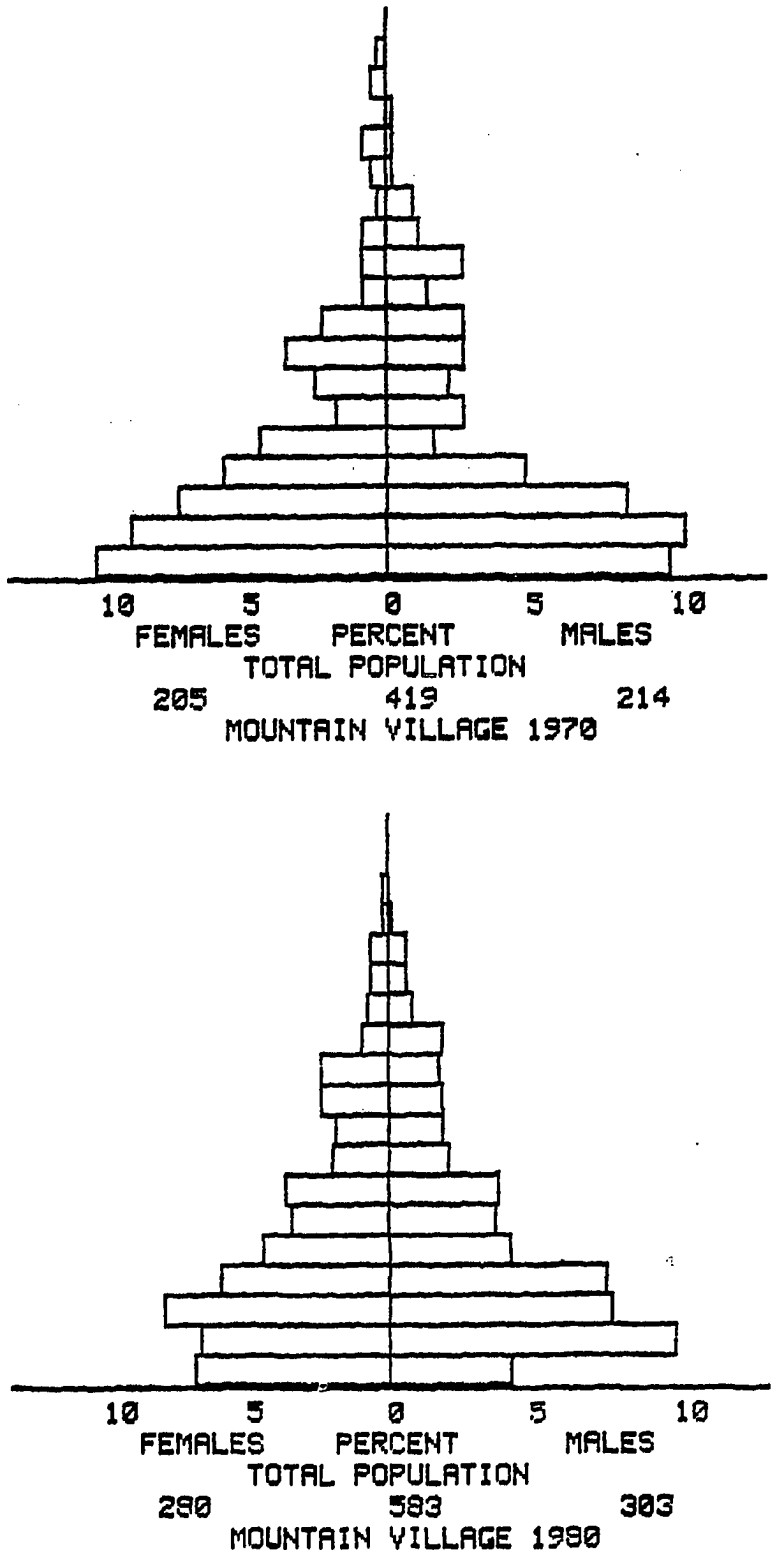


FIG. 35. POPULATION PYRAMIDS FOR MOUNTAIN VILLAGE IN 1970 AND 1980

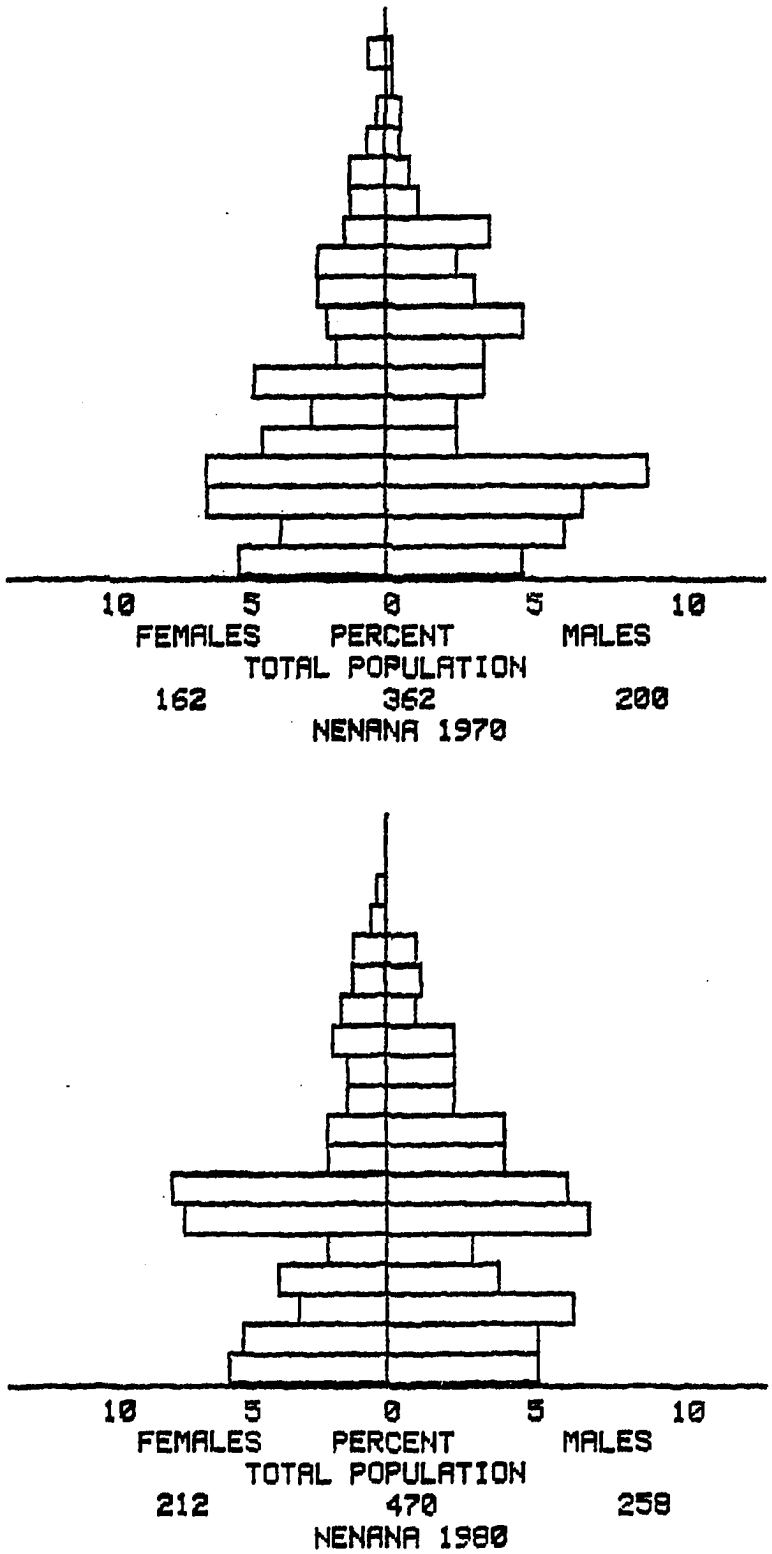
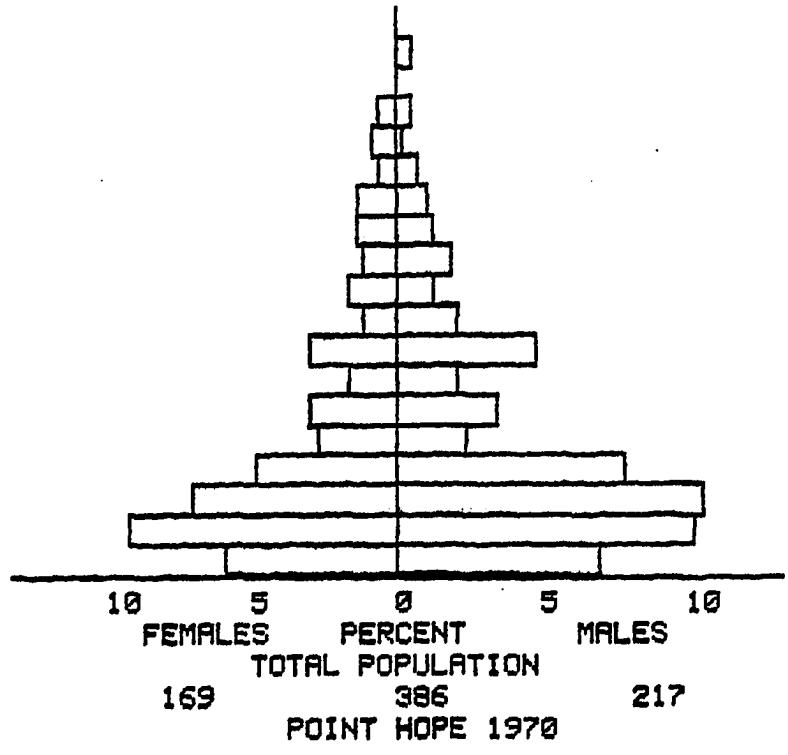


FIG. 36. POPULATION PYRAMIDS FOR NENANA IN 1970 AND 1980



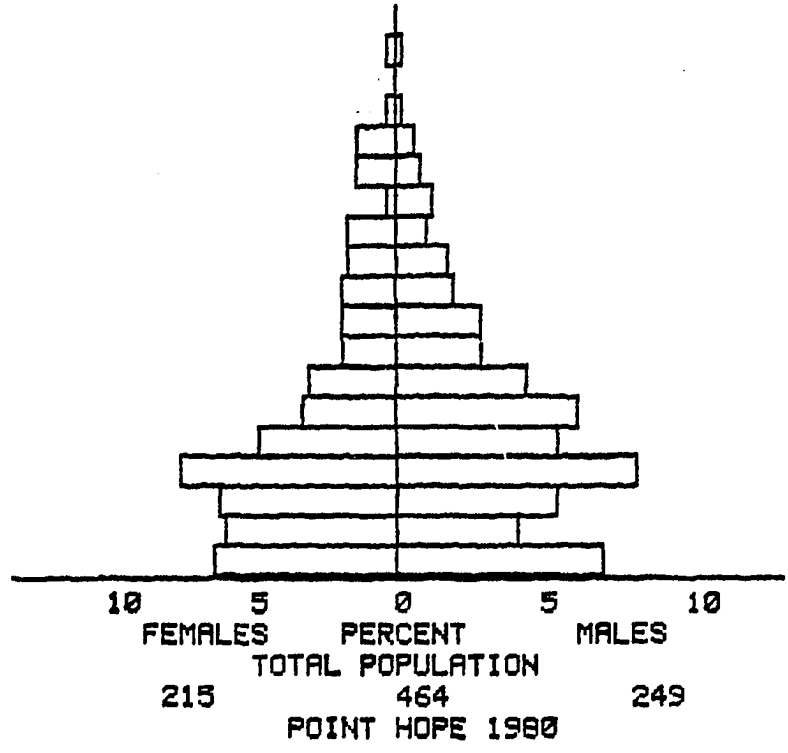


FIG. 37. POPULATION PYRAMIDS FOR POINT HOPE IN 1970 AND 1980

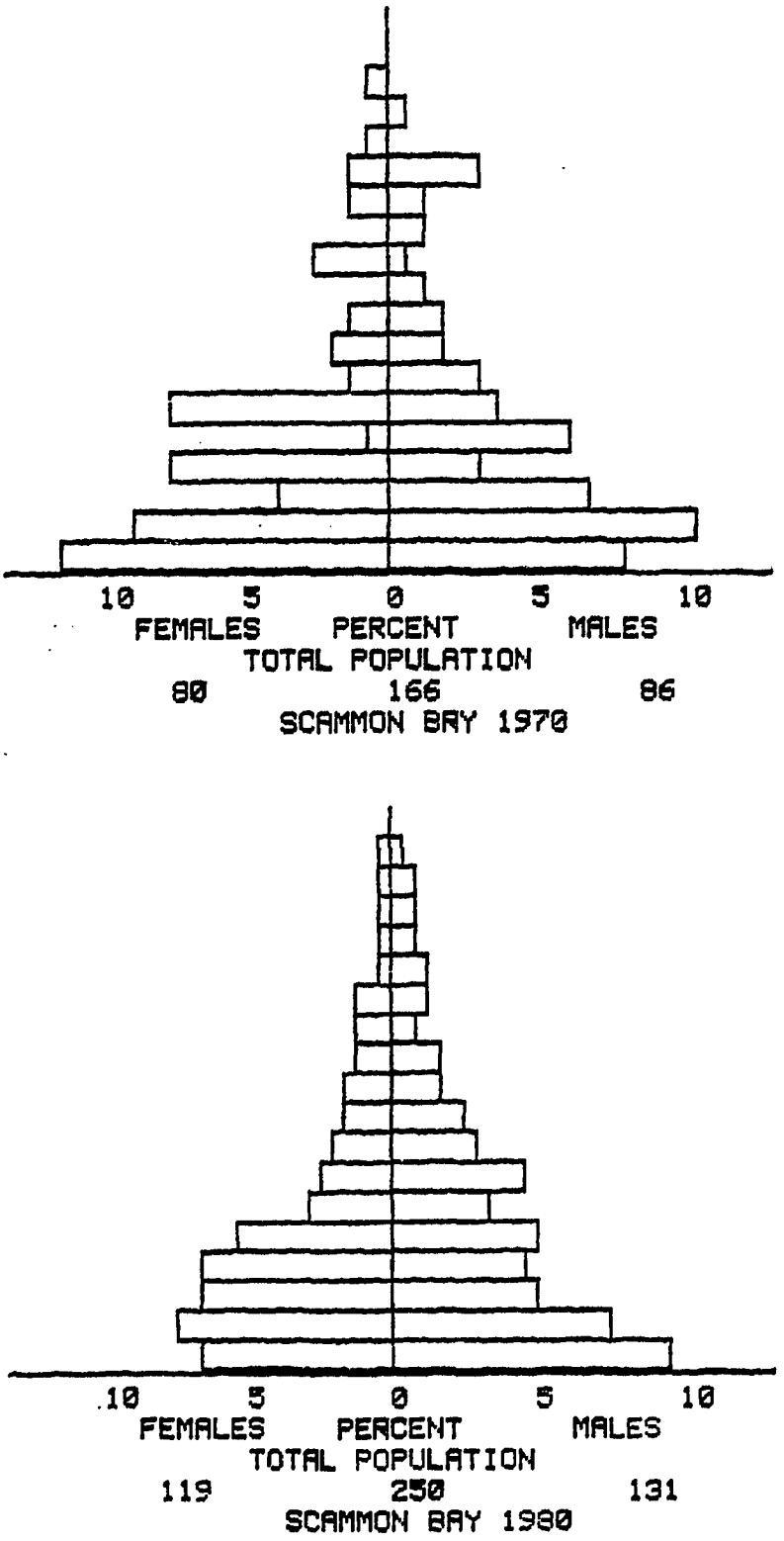
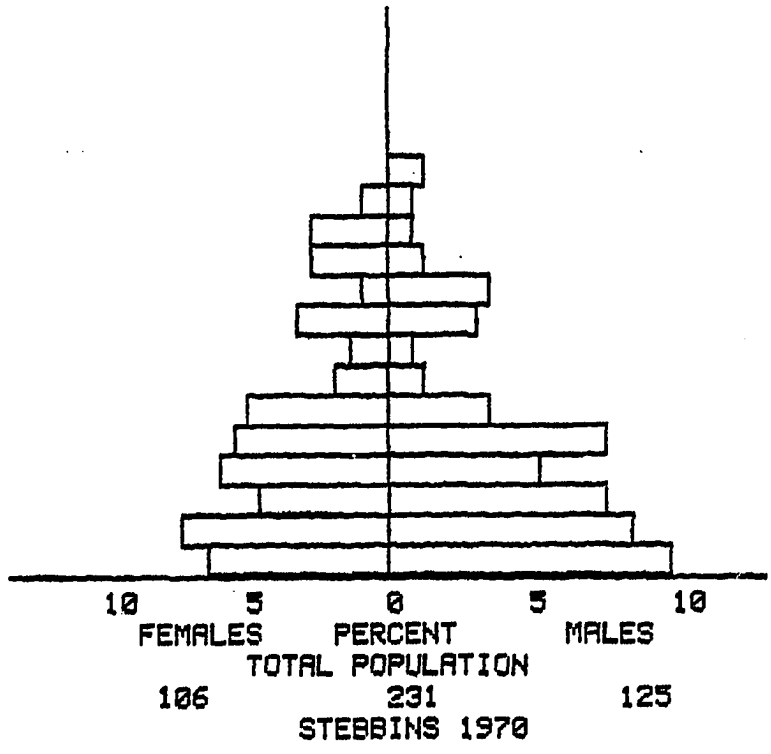


FIG. 38. POPULATION PYRAMIDS FOR SCAMMON BAY IN 1970 AND 1980



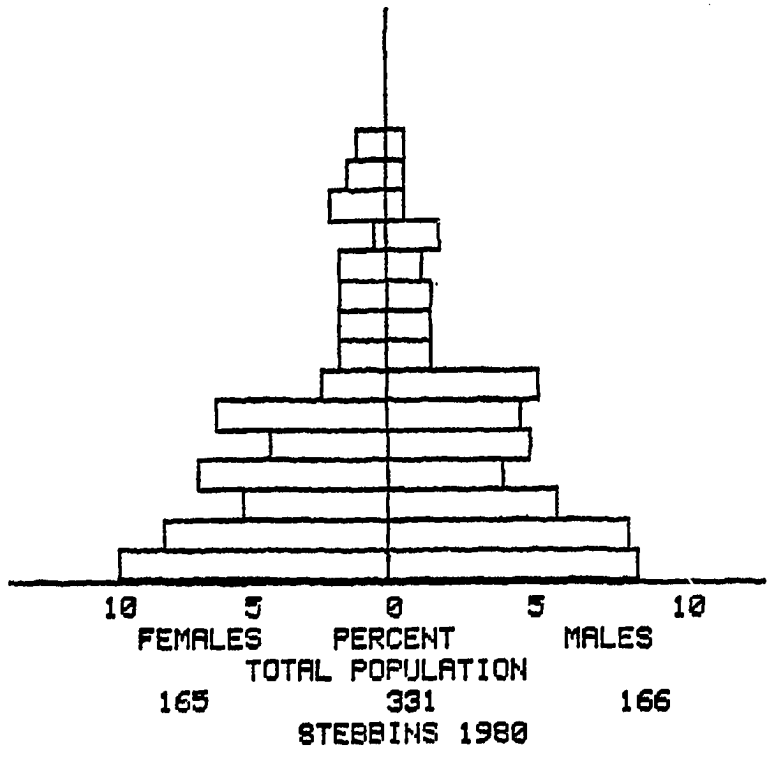


FIG. 39. POPULATION PYRAMIDS FOR STEBBINS IN 1970 AND 1980

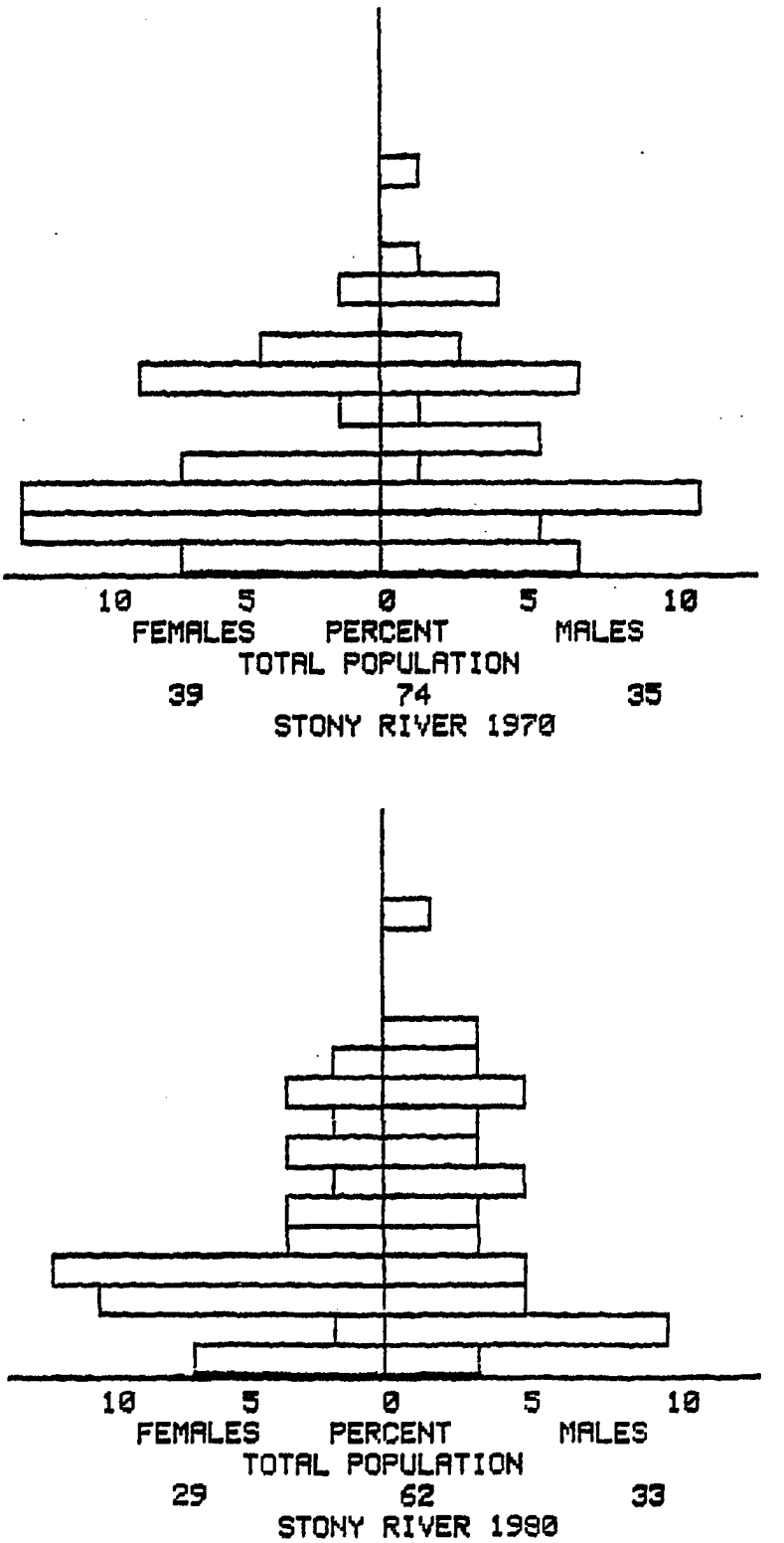


FIG. 40. POPULATION PYRAMIDS FOR STONY RIVER IN 1970 AND 1980

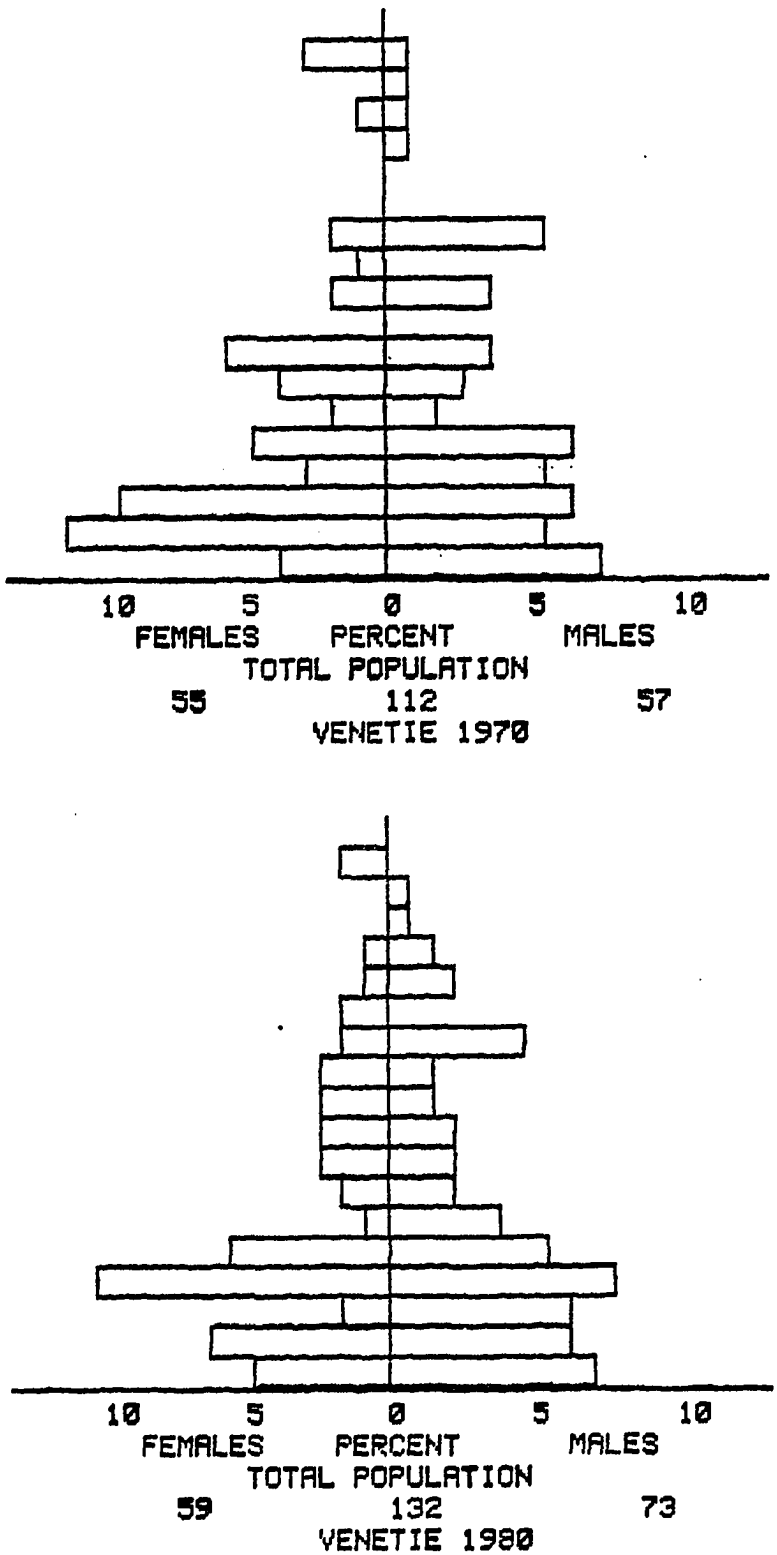


FIG. 41. POPULATION PYRAMIDS FOR VENETIE IN 1970 AND 1980

Some of the sampled communities grew rapidly during the 1970's, while others dropped in population. There is one noteworthy trend in the smaller rural communities between 1970 and 1980. The population pyramids for these communities are generally more symmetrical, and with fewer large, anomalous cohorts than there were in 1970. The larger urban areas tend to show roughly the same characteristics as in 1970, except for Juneau, which is probably the result of the explosive growth of state government during the past decade.

The trend toward regularity in age and sex distributions in rural communities may be significant. It probably indicates extensive inter-community migration in the past decade, but the distortions produced by large out-migrations of young people seem to be of lesser magnitude.

There is no way to define demographically what makes people move from one Alaskan community to another--demography can only document the phenomenon and look for possible relationships with other variables. In the smaller communities there is a population characteristic related to the rate of growth: the sex ratio. Table 6 lists the statistics for the smaller communities in this sample. A correlation coefficient was computed for the largely native communities in this sample. The variables used were the 1980 sex ratio and the percentage increase in population between 1970 and 1980. The correlation coefficient is significant at the .01 level. The correlation shows that rapidly growing communities tend to have a larger proportion of women than slowly growing or declining populations. The rate of growth in these communities exceeds that expected from natural increase alone, implying migration must be involved. Correlation is not causation, however, and it

is difficult to determine if one variable causes the other to occur. For the community sample as a whole, however, the sex ratio (# males/ # females) increased from 1.11 to 1.16, indicating a decreasing proportion of females in this rural sample.

URBANIZATION

Milan and Pawson (1975) studied the native population of Fairbanks in the early 1970's. They noted the native population of Fairbanks had increased sixfold between 1945 and 1970. The 1970 census (ISEGR, 1972) indicates 1,876 native residents of the Fairbanks census area. The 1980 census counted 2,987 native residents of the Fairbanks North Star Borough, a 59% increase in the past decade. Anchorage had an increase from 4,795 native residents to 8,953 in the past decade. These figures indicate a rapidly expanding native population in the largest Alaskan cities, but this does not, however, indicate a decrease in village populations. Traditionally Alaskan natives lived in very small face-to-face communities. Larger communities in rural Alaska, such as Kotzebue, Bethel, and Barrow, must have grown due to people moving to them from smaller communities. The areas surrounding these communities could never have supported the present populations following solely aboriginal subsistence patterns.

If instead of looking just at large urban areas when village/non-village populations are examined another pattern emerges. For the purpose of this examination a village is defined as a community with a population of less than one thousand individuals. Briar et al. (1973: 36) note that communities with more than a thousand individuals have

a much larger non-native population than smaller ones. This would seem to indicate a less traditional village organization. In 1970 approximately 21,860 natives lived in communities with over a thousand residents, or about 43% of the total native population. In 1980 about 26,500 natives lived in communities with over one thousand residents, or about 41% of the 1980 native population. The actual percentage of natives living in the larger communities is almost identical to what it was a decade ago.

As of 1980, at least, the traditional attractions of native village life seem to be holding their own against the economic attractions of urban life. This is especially significant since the 1980 native population is older than it was in 1970. The current village population has a larger proportion of young adults than were present in the 1970 census count, indicating they had made a conscious decision to live there.

This leaves the problem of: where did the urban migrants come from if not from the smaller communities? The rural native communities with populations between 1000 and 3000 seem to have had lower growth rates than either the smaller communities or the larger urban centers. Barrow lost 200 native residents between 1970 and 1980. The total population of Barrow increased during this decade because the non-native population increased by 138%. The Alaskan native population increased by 27% in the decade but the native population of Kotzebue rose by only 18%, and Metlakatla had a 7% native population increase. Bethel had a 30% increase in native population, only slightly higher than the state average, while the other intermediate sized communities in this

sample had growth rates well below the statewide average. The reduced growth rates for these communities indicates that some emigration is occurring to either the smaller communities or the larger urban centers like Anchorage or Fairbanks that had higher growth rates in this decade.

III

DIFFERENTIAL MORTALITY

The study of differential mortality in human populations is complex, with many unrelated factors affecting mortality rates (Preston, 1976; Kitagawa and Hauser, 1973). The most significant factors are age and sex. Over twice as many males (1,160) died in Alaska in 1980 as females (528). This is not unusual in a young population like Alaska. The Crude Death Rate (CDR) for Alaska in 1980 was 4.2/1000. For comparison, the CDR for the United States in 1967 was 9.36/1000. This difference highlights the age dependence of mortality rates. The United States had 9.5% of its population aged 65 or over in 1967, while Alaska in 1980 had less than 3% in that age category.

The only meaningful way to compare mortality patterns of two different populations is through the use of standardized rates which correct for age and sex distribution. Both Crude and Standardized Death Rates are presented in Table 7 for the different census areas. The population used to standardize them was the United States in 1967. When standardized using this population Alaska has a death rate of 8.1/1000, much closer to the U.S. mortality rate of 9.4/1000 than the crude rate. This means that if Alaska had the same age and sex distribution as the United States did in 1967, the CDR would be 8.1/1000 instead of 4.2/1000. All standardized mortality rates are adjusted to the same age and sex distribution in Table 7, making regional comparisons possible.

Table 7 brings out the contrast in mortality between densely

TABLE 7. CENSUS AREA CRUDE AND STANDARDIZED MORTALITY RATES FOR 1980

CENSUS AREA	TOTAL DEATHS	CRUDE DEATH RATE PER 1000	INDIRECTLY STANDARDIZED DEATH RATE
United States 1967(standard)		9.36	9.36
Alaska	1,688	4.20	8.06
1. North Slope Borough	28	6.67	12.00
2. Kobuk	39	8.07	12.26
3. Nome	53	8.11	12.50
4. Yukon-Koyukuk	55	6.99	11.83
5. Fairbanks North Star Borough	188	3.48	7.20
6. Southeast Fairbanks	15	2.64	5.39
7. Wade Hampton	24	5.14	9.45
8. Bethel	64	5.82	10.32
9. Dillingham	22	4.77	8.22
10. Bristol Bay Borough	3	2.74	5.81
11. Aleutian Islands	30	3.73	10.19
12. Matanuska-Susitna Borough	77	4.32	6.87
13. Municipality of Anchorage	593	3.40	7.47
14. Kenai Peninsula Borough	105	4.15	7.48
15. Kodiak Island Borough	50	5.03	9.96
16. Valdez-Cordova	45	5.39	8.99
17. Skagway-Yakutat-Angoon	38	10.93	15.07
18. Haines Borough	12	7.14	11.15
19. Juneau Borough	78	3.99	6.62
20. Sitka Borough	42	5.38	7.73
21. Wrangell-Petersburg	38	6.16	8.08
22. Prince of Wales-Outer Ketchikan	17	4.44	6.77
23. Ketchikan Gateway Borough	68	6.01	7.94

populated areas (relatively speaking, of course) like Anchorage, Fairbanks, Juneau, Kenai, and Matanuska-Susitna Boroughs, and the more rural areas of the state. The highest and lowest mortality rates were in the Skagway-Yakutat-Angoon Census Area and the Southeast Fairbanks Census Area, respectively. The highest standardized mortality rate was 180% higher than the lowest. Both of these census areas are relatively small in population, and looking back to Table 1 it appears both had unusual mortality patterns in 1980.

The Inupiaq Eskimo area of Alaska (approximately Census Areas 1-3) had a 1980 standardized mortality rate 64% higher than Anchorage. The Yukon-Koyukuk Census Area had a mortality rate about 58% higher than Anchorage. The Yupik Eskimo area of the state (approximately Census Areas 7-9) had a standardized mortality rate 25% higher than Anchorage.

There are undoubtedly a large number of factors responsible for these regional differences. Climate, subsistence practices, regional occupational differences, and social factors undoubtedly have a great role in differentiating mortality. None of these variables can be directly examined using census data. The census does provide information on housing, however, which might serve as an indicator of standard of living. The best indicator of housing quality was the presence or absence of plumbing. Actual value of housing was a question asked on the census, but Kruse and Travis (1981) noted that income questions were less likely to be answered correctly than other questions. Also, in this era of high inflation and interest rates, answers on value of housing might reflect more on knowledge of local housing markets than on actual value of housing.

Table 8 gives the values for ethnic composition of each census area and percentage of houses with complete plumbing. A correlation matrix was computed for these variables and standardized death rates. A multiple correlation coefficient was also computed to measure the effect of both ethnic and housing influences on mortality. All the correlation coefficients are significant at the .05 level, with all the bivariate correlations significant at the .01 level. In other words, census areas with a high percentage of native residents are likely to have higher mortality rates than other areas. Additionally, census areas with poorer housing are also more likely to have higher mortality rates than other ones. These conditions often coincide. This would seem to indicate that economic conditions have some relationship to mortality in the state. The relative importance of each factor in Alaska would be impossible to determine without further in-depth investigation.

Presence or absence of plumbing is a relatively simple question compared to many on the census form, but it is regarded here as an indicator more of general economic condition than whether a house has running water or not. It is thought a house without plumbing is much less likely to have equal insulation, floor space, or facilities compared to a house with complete plumbing. Even a casual visitor to rural Alaska would have to be very imaginative to think that rural communities have housing and living standards comparable to that in the urban areas. Briar et al. (1973:32-33) make the following comment about rural Alaska after a short and admittedly incomplete study of village life:

TABLE 8. CENSUS AREA MORTALITY RATES, ETHNIC COMPOSITION, AND PERCENT WITH PLUMBING IN 1980

CENSUS AREA	1 STANDARDIZED DEATH RATE	2 PERCENT NATIVE POPULATION	3 PERCENT WITH PLUMBING
1. North Slope Borough	12.00	76.80	21
2. Kobuk	12.27	85.14	48
3. Nome	12.50	79.15	38
4. Yukon-Koyukuk	11.83	55.46	33
5. Fairbanks N.S. Borough	7.20	5.53	90
6. Southeast Fairbanks	5.39	12.77	68
7. Wade Hampton	9.45	93.18	22
8. Bethel	10.32	84.07	28
9. Dillingham	8.22	76.26	54
10. Bristol Bay Borough	5.81	32.91	74
11. Aleutian Islands	10.19	24.89	91
12. Matanuska-Susitna Boro.	6.87	3.86	77
13. Anchorage	7.46	5.13	98
14. Kenai Peninsula Borough	7.48	6.87	87
15. Kodiak Island Borough	9.96	18.96	86
16. Valdez-Cordova	8.99	12.70	74
17. Skagway-Yakutat-Angoon	15.07	42.04	76
18. Haines	11.14	12.70	76
19. Juneau	6.62	11.21	96
20. Sitka	7.73	21.39	96
21. Wrangell-Petersburg	8.08	19.30	91
22. Prince of Wales-Outer Ketchikan	6.77	43.20	87
23. Ketchikan Gate. Borough	7.94	12.42	96

CORRELATION MATRIX

	COL. 1	COL. 2	COL. 3
COL. 1	1.00		
COL. 2	.54	1.00	
COL. 3	-.51	-.87	1.00

All bivariate correlations are significant at the .01 level. Multiple correlation of Cols. 2 & 3 on Col. 1 is .55

> Most village Natives do not have job incomes and must rely upon gathered resources from the lands and waters for their subsistence. Hunting, fishing and trapping are part of the regular routine in all of the villages. Unemployment, social security and public assistance benefits are crucial to the village inhabitants, particularly during the winter when the overall rates of joblessness typically approach 80 or 90 percent. Natives with year-round jobs comprise only about ten percent of the village work force. The lack of cash income coupled with the high prices throughout Alaska mean that the large majority of village Natives are living, by any measure, in extreme poverty and could not survive at all without the natural products of the land and water.

Briar and his associates applied standards perhaps not applicable to the unique ecological and cultural background of Alaskan natives, but their impressions do bring out some of the qualitative differences between urban and rural living conditions. The percentage of plumbing statistic used here is an attempt to quantify this obvious qualitative difference.

There are some indications that mortality may be more closely linked to economic conditions than previously believed. Kitagawa and Hauser (1973) did an extensive study on differential mortality in the United States. They found a strong relationship between access to economic resources and mortality, both within and between racial and ethnic groups. For example, they found accident rates were 127% higher among the lowest white male socioeconomic groups than among the highest (Kitagawa and Hauser, 1973:77). They also found that non-whites generally tended to have higher mortality rates than whites, except for the Japanese residents of the U.S., who have higher median incomes than whites. In addition they postulate that some of the

differences in mortality are related to ethnic differences in median income.

> Particularly significant, among the findings for the nation as a whole, are the great differences between the death rates of whites and nonwhites, especially Negroes and Indians. The very high mortality of these minority groups constitutes stark evidence of their underprivileged status in this nation. Moreover, the emergence of large mortality differentials by socioeconomic level within the nonwhite population suggests that much, if not all, of the excess mortality of Negroes and Indians can be reduced with increases in levels of living and life styles. (Kitagawa and Hauser, 1973:179)

Preston (1976) analyzed differential mortality in national populations and found a curvilinear realtionship between income and mortality. With the advent of modern medical care, he notes that instead of reducing the dependence of mortality on income, it actually seemed to increase it.

Krause and Buffler (1979) cite psychological factors for high morbidity and mortality among Alaskan natives. McNabb (1980) looked at alcohol abuse as a causative factor in high native mortality. Undoubtedly these factors are important in influencing mortality rates, but the economic factor has not been researched at all, and the possibility of poor living conditions as a factor in high mortality rates has been left unexamined. Economic options are still relatively limited in most of rural Alaska, and while not as amenable to treatment as setting up mental health and alcoholism programs, providing real opportunities for economic improvement might be important in reducing high mortality rates. If the differentials found among whites in the continental U.S. hold true for non-native Alaskan populations then

mortality rates for the poorest segments of the non-native community might equal native mortality. Unfortunately, the State of Alaska has never collected or made available the information necessary to test this hypothesis.

COMPONENTS OF MORTALITY

Demographers often classify all non-disease deaths (accidents, suicides, homicides) as violent deaths. Blackwood addressed mortality components in natives with special emphasis on violent deaths in a series of monographs published by the Alaska Area Native Health Service (Blackwood, 1979a,b, 1980b,c). Krause and Buffler (1979:135) note:

> Violent death, that is, deaths due to accidents, homicide, suicide and alcohol, is seen by many as an indicator of the mental health of a population, the stresses which are endured by its members, and its degree of social disorganization.

Blackwood (1979b:10) notes that the only population with similar accident rates (the cause of the vast majority of violent deaths in Alaska) are non-native Alaskans. A great deal of epidemiological detail is presented to back up these arguments, and they cannot be covered here in the same detail. Once again, only the broadest overall patterns are examined.

As noted earlier, Alaskan natives account for about 16% of the Alaskan population. Of 1,688 Alaskan deaths in 1980, 471 (483 including non-Alaskan natives) or 28% were Alaskan native deaths. This was not an unusual year. During the years 1975 to 1979 natives constituted 2224 out of 8047 Alaskan deaths, or 28%. Greater detail is presented

in Tables 9 and 10. These tables show that violent death is unusually common for Alaskan natives. It is an unfortunate fact that 16% of the population accounts for 28% of the total deaths in the state, but high violent death rates are not the only problem. In Table 9 one non-violent death rate is included--flu and pneumonia deaths. Over the past six years natives have accounted for almost half of the deaths attributed to flu and pneumonia in the state. What Table 9 shows is that Alaskan natives have very high non-violent death rates in addition to the much more publicized violent death rates (Anchorage Daily News, 1981).

Table 10 includes national data published by the National Center for Health Statistics (1980) for the year 1977--the year for which national data are most readily available. In this table it can be seen that the proportions of deaths are much closer to each other among all Alaskan populations than any Alaskan population is to the United States as a whole. Although absolute death rates are substantially higher for natives, the general patterns of mortality appear to be very similar.

One final comparison remains to be made. Since non-natives appear to have significantly lower mortality in urban areas, is the same true for natives? To determine this, all the incorporated communities listed by the census (Bureau of the Census, 1981) were broken down into communities with less than a thousand residents and those with more than 1000. The deaths for these communities were tabulated and crude death rates calculated. In the smaller communities there were 174 native deaths out of a population of 26,740, producing a CDR of 6.5/1000. Non-native deaths in the same communities totalled 62 of a

TABLE 9. ALASKAN CAUSES OF DEATH 1975-79 AND 1980

	TOTAL ALASKA 1980	NATIVES* (% of total) 1980	TOTAL ALASKA 1975-79	NATIVES* (% of total) 1975-79
All Causes	1,688	471	8,047	2,224
Percent	100%	28%	100%	28%
Homicides	33	18	221	75
Percent	100%	54%	100%	34%
Suicides	72	19	345	109
Percent	100%	26%	100%	32%
Accidents	415	159	2,131	659
Percent	100%	38%	100%	31%
Flu & Pneumonia	36	14	213	106
Percent	100%	39%	100%	50%

*These totals were tabulated excluding non-Alaskan natives by the State Government. In almost all the other tables, except Table 10, non-Alaskan native Americans are included since they are included in the census counts in the same category as Alaskan natives. Non-Alaskan natives accounted for only 12 deaths in 1980, or about 2.5% of the total.

TABLE 10. ALASKAN AND UNITED STATES 1977 MORTALITY

	UNITED STATES	ALASKA TOTAL	ALASKA WHITES	ALASKA* NATIVES
All causes	1,899,597	1,606	1,090	395
Percent	100%	100%	100%	100%
Accidents	103,302	409	263	120
Percent	5.4%	25%	24%	30%
Suicides	28,681	89	60	20
Percent	1.5%	6%	6%	5%
Homicides	19,968	36	19	9
Percent	1.0%	2%	2%	2%
Alcoholism	- - -	31	12	13
	- - -	2%	1%	3%
Cirrhosis of the liver	30,848	37	26	9
Percent	1.6%	2%	2%	2%

*Non-Alaskan natives excluded.

population of 9,853, producing an overall non-native CDR of 6.3/1000.

This does not mean that native and non-native mortality rates were similar in all census areas (Table 11). For example, in Census Area 4, Yukon-Koyukuk, which has no communities with over one thousand residents, the 1980 native CDR was 8.7/1000 while non-native CDR was only 4.9/1000. The same pattern of higher rural native mortality compared to non-native mortality predominated throughout mainland Alaska. In Southeast Alaska non-native Crude Death Rates are much higher in some rural areas. In Census Area 17, Skagway-Yakutat-Angoon, the non-native CDR was 10.4/1000 and in Haines Borough the non-native CDR was 7.5/1000. This high non-native mortality in Southeast Alaska appears to have raised the statewide average to near equality for natives and non-natives in rural areas.

In urban areas the CDR for natives increased to 9.3/1000 while the non-native CDR dropped to 4.0/1000. Unfortunately, the detailed age and sex distributions necessary for standardization are not yet available.

It is interesting to note that the difference between native and non-native crude death rates drops substantially in rural areas. Major causes of accidental deaths in Alaska are significantly different than those in the continental United States. In 1980 only 89 out of 415 accidental deaths were motor vehicle related, or 21% of the Alaskan total. This is the largest single cause of accidental death in Alaska, followed by drowning, water transportation, and other causes. In the United States as a whole, motor vehicle accidents account for over 44%

TABLE 11. CRUDE DEATH RATES FOR CENSUS AREAS IN 1980

CENSUS AREA	NATIVE* CDR/1000 1980	NON-NATIVE* CDR/1000 1980
Alaska	7.53	3.60
1. North Slope Borough	8.06	2.05
2. Kobuk	8.27	6.96
3. Nome	10.24	4.40
4. Yukon-Koyukuk	8.70	4.85
5. Fairbanks North Star Borough	7.03	3.29
6. Southeast Fairbanks	6.90	2.02
7. Wade Hampton	5.29	3.14
8. Bethel	6.60	1.71
9. Dillingham	5.97	3.65
10. Bristol Bay Borough	2.78	2.72
11. Aleutian Islands	5.69	1.89
12. Matanuska-Susitna Borough	4.36	4.32
13. Municipality of Anchorage	7.93	3.17
14. Kenai Peninsula Borough	5.75	4.03
15. Kodiak Island Borough	6.90	4.59
16. Valdez-Cordova	11.32	4.53
17. Skagway-Yakutat-Angoon	11.63	10.42
18. Haines Borough	4.67	7.50
19. Juneau Borough	5.02	3.86
20. Sitka Borough	10.78	3.91
21. Wrangell-Petersburg	8.40	5.63
22. Prince of Wales-Outer Ketchikan	6.66	2.76
23. Ketchikan Gateway Borough	8.53	5.65

*Crude Death Rates for a number of the smaller census areas would tend to have large variations from year to year. Some figures in this table were calculated from only one or two deaths.

of all accidental deaths and falls are the second largest category (Blackwood, 1979b). Residents of rural Alaska may very well spend much more of their time engaged in these activities that consume little of the time of urban residents yet constitute a large proportion of Alaskan accidental deaths.

IV

DIFFERENTIAL FERTILITY

Changes in fertility rates due to temporal, spatial, and cultural differences have traditionally attracted the most attention in demographic research. There is an enormous literature on this topic. Recent studies include work on the economic determinants of fertility change (Beaver, 1975) and sociological factors associated with fertility (Rindfuss and Sweet, 1977). The anthropological literature is extensive and almost unique in examining individual motivations for fertility decisions (Nardi, 1981; Polgar, 1972; Nag, 1972; Baker and Sanders, 1972; Marshall et al., 1972).

Rapid population growth as experienced in the past two centuries is very rare in human history. Populations must have been almost stable before the Neolithic Revolution, and growth rates remained close to equilibrium for hundreds of thousands of years. If this were not the case overpopulation would have been historical fact with starvation the only check (Cowgill, 1975; Keyfitz, 1977).

Modern study of the demography of hunting and gathering societies (Howell, 1979, 1980; Binford and Chasko, 1976) indicate that fertility is normally well below maximum in these groups. Howell (1980) proposes a three tiered heirarchy of fertility control: the most restrictive is biological and physiological factors such as sterility. If a person lacks the ability to have children then cultural and personal decisions will have no effect and are irrelevant. Howell's second factor is cultural controls on fertility such as mandatory sexual abstinence or

cultural patterns that mandate long periods away from home. The third factor is conscious individual control which can have effect only if the first two factors allow the option of having children. Howell (1979, 1980) argues in her study of !Kung Bushmen that the biological and cultural controls were the major ones in non-industrial societies, as opposed to modern industrial societies where individual choice is the major controlling mechanism through contraception. Howell (1980) believes that cultural fertility control could have evolved through group or kin selection to keep populations from expanding beyond available resources.

Binford and Chasko (1976) in a study of fertility among the Nunamiut Eskimo of Anaktuvuk Pass for the period 1935 to 1970 note that a number of cultural factors may have contributed to low fertility in aboriginal times (Binford and Chasko 1976:130):

> Based on the information currently available, it would appear that miscarriages account for 6.4 percent of the difference between pre and post-sedentary crude birth rates, changes in the pattern of male absenteeism account for 6.1 percent, and an overwhelming 87.5 percent of the contrast is apparently to be attributed to changes in diet (related both to reductions in seasonal variance of caloric intake and increases in the carbohydrate proportion of the diet). This generalization assumes, of course, that we have monitored all potential determinants. It must be cautioned that differences in miscarriage rates may be responding to the same determinants as fecundity; in this case a greater proportion of the difference would accrue to dietary differences.

These mechanisms could be considered as cultural fertility controls since the majority of fertility control was achieved through society wide cultural practices. They note a very rapid increase in birth

rates immediately following sedentization in 1950 (Binford and Chasko, 1976:73), due to the concomitant changes in cultural activities.

Other studies of Alaskan native fertility have been conducted by Milan (1970, 1974/75, 1978), Milan and Pawson (1975), and Blackwood (1980a). Milan (1974/75) notes that the 1880 census counted about 33,000 native inhabitants in that year. Population reductions occurred in the succeeding decades due to imported epidemic diseases. Milan estimates the native population did not regain its 1880 size until 1947. The 1980 census figure stands at about 64,000, or about double the 1947 figure. This would indicate an actual doubling of population in about 35 years. The native residents of northern Alaska studied by Milan (1970, 1978) reported an average of almost ten pregnancies per woman during complete reproductive period. He attributes this rapid increase in population to improved medical care and reduced infant and childhood mortality. These populations became sedentary as schools were established in Barrow and Wainwright in the late 1800's and early 1900's.

An important statistic in measuring population growth is the Rate of Natural Increase (RNI). It is computed by: Rate of Natural Increase = Crude Birth Rate - Crude Death Rate. This statistic is often expressed in rates per thousand like the crude vital rates it is calculated from. The RNI for Alaska natives in 1980 was 22.7/1000 or about 2.3% per year. This may sound low, but if this rate remained constant for another thirty years the population would again double (Shryock et al., 1976:217). This figure is, however, far lower than the highest ever recorded for Alaskan natives. With increasing seden-

tization and improved health care, population growth rates increased rapidly in the 1940's and 1950's. Blackwood (1980a) records a peak growth rate of 38.5/1000 or 3.85% annually in 1962. This would double the population in about 18 years. During the years subsequent to this peak growth rate, birth rates declined greatly lowering the rate of native population growth.

The rate of growth for the white Alaskan population in 1980 was not very different from the native population with an RNI of 18.7/1000 or about 1.9%. This rate would double the white population (without any further immigration) in about 37 years. This high rate of population growth at present is a result of the youthfulness of the total Alaskan population, both native and non-native. A large proportion of the Alaskan population is within the childbearing years. Standardized birth rates are presented in Table 12 for each of the census areas.

Median age statistics are another useful way of assessing the youthfulness of a population. This is included in Table 12 for the census areas. The median age is the age at which 50% of the population is younger, and another 50% is older. Median ages have either been taken directly from census printouts (it is one of the statistics available directly from tape data) or have been calculated from 5 year cohort age distributions following a formula provided by Shryock et al. (1976).

Table 12 shows that standardized birth rates are the highest for census areas with a large proportion of native population, especially primarily Eskimo areas such as Wade Hampton and Kobuk Census Areas. These areas also have the lowest median ages. Referral to the popula-

TABLE 12. CENSUS AREA CRUDE AND STANDARDIZED BIRTH RATES IN 1980

CENSUS AREA	CRUDE BIRTH RATE/1000	STANDARDIZED BIRTH RATE	MEDIAN AGE
United States 1967 (standard)	17.8	17.8	
Alaska	23.6	16.4	26.1
1. North Slope Borough	24.3	19.1	24.7
2. Kobuk	30.2	23.9	21.6
3. Nome	30.4	24.3	23.4
4. Yukon-Koyukuk	23.8	19.8	25.4
5. Fairbanks North Star Borough	26.1	17.2	25.8
6. Southeast Fairbanks	25.2	18.0	24.6
7. Wade Hampton	27.9	23.0	20.0
8. Bethel	26.1	20.1	22.1
9. Dillingham	26.2	19.0	23.3
10. Bristol Bay Borough	9.1	8.1	26.6
11. Aleutian Islands	21.2	14.4	24.5
12. Matanuska-Susitna Borough	21.4	17.1	26.9
13. Municipality of Anchorage	22.6	14.8	26.3
14. Kenai Peninsula Borough	23.3	17.6	26.8
15. Kodiak Island Borough	27.7	19.4	25.9
16. Valdez-Cordova	21.4	16.4	27.4
17. Skagway-Yakutat-Angoon	24.2	18.9	26.6
18. Haines Borough	22.0	18.0	28.8
19. Juneau Borough	21.8	15.0	28.1
20. Sitka Borough	28.1	20.8	26.4
21. Wrangell-Petersburg	19.5	15.4	27.3
22. Prince of Wales-Outer Ketchikan	21.2	17.6	25.6
23. Ketchikan Gateway Borough	21.9	17.3	27.9

tion pyramids for these areas (Fig. 5-6) show the characteristics of fast growing, high fertility populations. These population pyramids have a bottom heavy appearance, with a large proportion of the population at the bottom of the pyramid in the lower cohorts. Comparison with the pyramid in Figure 3 for Honduras, however, shows that the population growth in Alaska is much less than in an underdeveloped country. Alaskan native fertility is not as great as many parts of the developing world and fertility rates seem to have decreased in recent years. This decline is evident in Figures 5, 8 and 9 in the pyramids for the North Slope Borough, Dillingham, and Bethel which show some features of the "christmas-tree" shape characteristic of a population with declining birth rates.

The decline in native fertility is also apparent in the changes in median ages of communities between 1970 and 1980 (Table 13). Most of the smaller communities in Table 13 had about a five year increase in median age in the past decade. The entire state has had an increase of about 3.2 years in median age in the same time period. Communities with a large proportion of non-natives show a much smaller increase in median age, probably due to in-migration of young people to work on the pipeline. Unfortunately, comparable regional age distributions are not available for censuses before 1970.

Birth patterns are also an indicator of comparative fertility. In a population where women are giving birth to more surviving children than in another population, it is expected that the high growth population might spread its births out over a longer period. This might show up in earlier or later childbearing practices. There is some evidence

TABLE 13. COMMUNITY MEDIAN AGES 1970 AND 1980

COMMUNITY	MEDIAN AGE 1980	MEDIAN AGE 1970
Alaska	26.1	22.9
Aleknagik	25.0	18.4
Anaktuvuk Pass	20.7	19.5
Anchorage	26.3	24.2
Barrow	24.1	17.1
Bethel	23.6	17.9
Chalkyitsik	22.4	17.5
Chignik Lake	21.3	14.5
Deering	20.0	14.8
Fairbanks	25.9	24.3
Gambell	21.4	19.6
Huslia	22.8	17.5
Iliamna	24.3	22.5
Juneau	28.1	27.9
Kiana	20.0	15.0
Kotzebue	23.1	17.0
Koyukuk	22.6	17.1
Kwigillingok	18.7	16.6
Metlakatla	23.0	20.4
Mountain Village	18.0	14.0
Nenana	27.9	22.3
Point Hope	20.5	15.9
Scammon Bay	19.0	16.2
Stebbins	17.5	18.5
Stony River	19.0	14.1
Venetie	20.5	20.0

that in 1980 there were some very slight differences in childbearing between natives and non-natives. Alaska as a whole had 68% of the total births in the mother's age cohort 20-29. Heavily settled areas like Anchorage and surrounding census areas ranged from 69-73% of births in that cohort. The North Slope Borough and Kobuk Census Areas had only 49-59% of births in this interval, while having a relatively larger proportion of births in the 15-19 age category. This would seem to indicate there was a pattern of slightly earlier childbearing in Inupiaq Eskimo areas in 1980. In Southwestern Alaska the same pattern appeared in smaller magnitude in the Wade Hampton Census Area but not in the Bethel or Dillingham Census Areas. Thus while there may be some cultural differences in patterns of childbearing they are not great and persist in only northwestern areas of Alaska.

DEMOGRAPHIC TRANSITION

Blackwood (1980a) notes that native population growth rates are about the same as they were in 1950. Both birth rates and mortality rates were much higher then than at present but in almost the same state of balance. During the 1950's major improvements in native health care were achieved, significantly reducing high death rates due to infectious disease. This left the classic model of demographic transition: high fertility rates and low mortality rates. Binford and Chasko (1976) challenge this conventional model noting that "population growth among the Nunamiut approached 'transitional' levels through a rise in birth rates rather than through a decrease in death rates" (1976:113). Whatever the initial cause of rapid population growth,

during the next 25 years or so birth rates declined, slowing explosive population growth. In European examples of demographic transition, the average rate of decline in the Crude Birth Rate was .26/1000 per year (Beaver, 1975:23). The decrease in the Crude Birth Rate among Alaskan natives between 1962 and 1968 was more than 2.7/1000 per year, or about ten times the rate of decline in European populations undergoing transition.

There are probably several components to this decline. One is active family planning assistance by health agencies in the past two decades. Intermarriage with non-natives may also be a factor. Milan and Pawson (1975) note an increase in marriages between natives and non-natives in the early 1970's and Blackwood (1980a) estimates that over 40% of the children born to a native parent have a non-native for the other parent.

V

CONCLUSIONS

Analysis of current demographic data indicates that migration has had a powerful effect on population structure in Alaska in the past decade. There has been a large number of non-native migrants to the state in the past decade. During this same period an increasing number of natives have moved to the major cities, while village populations (communities of less than 1000) have retained about the same proportion of the native population as in 1970. Population pyramids for these communities indicate more even age and sex distributions than in 1970.

During the decade 1970 to 1980 there has been a continued decrease in native fertility rates, although in 1980 standardized and crude native birth rates are still higher than non-native rates. This fall in fertility rates has been reflected in a large increase in median age in many of the smaller native communities. The fall in native fertility has been very rapid compared to similar trends in Europe.

In sum, native society in rural Alaska seems to be maintaining features that cause people to continue to reside in rural communities. The recent decline in native birth rates seems to indicate that Alaskan natives might be at the end of a period of high population growth known as demographic transition.

Standardized native mortality rates are still substantially higher than the rates for non-natives. Crude death rates for natives are higher in urban areas than for non-natives. In terms of patterns of mortality, however, non-native Alaskans have similar proportions of

deaths in violent categories, although of a lesser rate per capita. Patterns of accidental death in Alaska differ significantly from causes of death in the rest of the United States.

A number of researchers have looked to demographic techniques for explanations of differential morbidity and mortality in Alaska. Nathan Keyfitz (1977:Chap. 12) notes that an inductive approach is a necessary part of demographic research. Demographers are almost plagued by too much data. It is very difficult to know which variables are significant and which are irrelevant. Until a deductive framework can be established it is impossible to find definitive answers. Until that time, however, the Occam's Razor approach might be the most valid. This is basically a search for the simplest explanation consistent with the facts as presently known. Krause and Buffler (1979) studied morbidity and mortality in Alaskan natives due to:

> one aspect of the shattering impact upon these traditional ways of life of a process of acculturation which has been excruciating in its speed and intensity. For many Native Alaskans, and especially for the young, the breakdown of the organized, consistent, traditional relationships due to pressures from without has resulted in a reduced ability to find and hold a position of psychological integrity and centrality. Loneliness, anxiety, frustration, continuing stress, and at times despair characterize the lives of many Native Alaskans today. In the Western medical system these people come to be called mentally ill or alcoholic. (Krause and Buffler, 1979:119)

McNabb (1980) notes that alcoholism seems to be an important element in high mortality rates for Alaskan natives, but notes (1980:129):

> We must be cautious about trying to identify cause and effect in these comparisons, however. A substantial correlation only means that the two variables behave in a similar fashion, not that one causes or leads to the other. We might be tempted to ask, does stress or life change cause drinking problems? This has in fact been suggested in many circles; the whole "anxiety theory" of drinking discussed in previous sections hinges on this kind of explanation. Stress management is also a key component in treatment for alcoholism. In strict terms, though, all we can be sure of is that stress and problem drinking are associated with one another, or that the one coincides frequently with the other. But we shouldn't forget that problem drinking itself leads to stress and a number of life changes (such as lost jobs, divorce, loss of friends, arrest and so forth). It may not even be as simple as the "chicken and the egg" problem; that is, which comes first? Perhaps both stress and abusive drinking are consequences of another set of variables that are not identified at present.

It seems quite evident that the relationship between stress and high mortality is difficult to define. Both of the studies cited above do include economic stress as a major variable. The important point is that even with extensive mental health programs and counseling, they are only treating the stress symptoms and not the causes. If differential economic status is a basic cause of high mortality, then it would seem likely that removal or improvement in that problem would remove a large amount of the stress present.

The possible correlation of lack of economic assets with high mortality has been proposed in this paper as an element in high mortality rates among natives. Inadequate housing is unhealthy, a simple fact of elementary public health especially valid with increasing rural populations. In many rural areas the majority of inhabitants

still live without plumbing (Table 8). It also seems likely that if people cannot afford plumbing it is unlikely they can afford the other conveniences of our society. A snowmachine, rifle, or riverboat may be necessary in providing sustenance, but lifejackets and survival gear may be an expense that is met by the cheapest legal minimums or goes by the wayside.

Differential access to economic resources may correlate with access to quality medical care. Some form of medical care is provided to all regardless of ability to pay, but the actual quality of that medical care is difficult to determine. It is somewhat telling, however, that in the rest of the United States mortality rates seem to relate closely to income (Kitagawa and Hauser, 1973). Is it only a coincidence that the same association can be shown in Alaska for the poorer census areas?

Economic options and resources are not as available to natives in our society as to non-natives. In the continental U.S. rural residents usually have a longer life expectancy than urban residents (Kitagawa and Hauser, 1973). This is not the case in Alaska, possibly due to economic factors. While economic development may not be as cheap or cost effective as mental health programs in reducing mortality rates, it may very well turn out to be a necessary adjunct to those programs.

SUGGESTIONS FOR FUTURE RESEARCH

Several areas of interest have emerged from this preliminary analysis of the 1980 census data for Alaska. One of the most important in terms of social and political policy would be to pursue inquiries

into differential mortality among non-native Alaskans, as a means of confirming or refuting some hypotheses presented here.

Another important area of demographic research in Alaska would be to study the rapid decline in native fertility in the past two decades. It is easy to state that the decline is probably the result of modern contraception and family planning, but in many areas of the world government efforts in encouraging family planning have met with failure. The reasons for Alaskan success in this area would seem to merit further study.

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